



**University of Kerala**

**Four Year Under Graduate Programme  
(UoK FYUGP)**

**Syllabus**

**Major Discipline **Geography****

**May 2024**

## **About the Discipline**

Geography is a multifaceted discipline that explores the spatial characteristics and attributes of our planet. It encompasses both physical and human aspects, making it a bridge discipline between the natural and social sciences. The discipline incorporates the dynamic study of the Earth's landscapes, environments, and societies, exploring the intricate relationships between human populations and the natural world. Through an interdisciplinary lens, it investigates the spatial distribution of phenomena, from physical features like mountains and rivers to cultural aspects such as languages and economies. By integrating insights from fields such as cartography, environmental science, and anthropology, Geography equips students with a holistic understanding of global patterns and processes, enabling them to analyse complex issues like climate change, urbanization, and sustainable development.

This undergraduate programme in Geography explores the fundamental principles and methodologies of Geography, fostering critical thinking, spatial reasoning, and a deep appreciation for the interconnectedness of our planet. Geography offers a unique perspective on how human societies both shape and are shaped by their environments. Through fieldwork, geospatial analysis, and the examination of diverse cultural perspectives, students inspect the complexities of spatial interactions at local, regional, and global scales. The course also looks into the key themes such as land use, population dynamics, and geopolitical conflicts and sustainable resource management, empowering students to address real-world challenges with informed solutions. By blending theoretical concepts with practical applications, Geography fosters a sense of global citizenship and environmental stewardship, preparing students to navigate the complexities of our ever-changing world with insight and expertise.

The aim of the programme is to provide a solid foundation in all aspects of Geography and to show a broad spectrum of modern trends in Geography and to develop experimental, synthetic and application skills of students. The syllabi are framed in such a way that it bridges the gap between the Higher Secondary and Post Graduate levels of Geography by providing a more concrete and logical framework in almost all areas of the subject.

## Graduate Attributes

Graduate attributes bridge the gap between academia and the real world, fostering lifelong learning and meaningful contributions. They denote the skills, competencies and high-level qualities that a student should acquire during their university education. Apart from gathering content knowledge, these attributes go beyond the assimilation of information to its application in various contexts throughout a graduate's life. It aims in inculcating the art of critical thinking, problem solving, professionalism, leadership readiness, teamwork, communication skills and intellectual breadth of knowledge. The University of Kerala envisages to pave the path in guiding the student's journey to shape these attributes uniquely, making them integral to personal growth and success in various spheres of life. The University strives to ensure that these graduate attributes are not just checkboxes, but they play a pivotal role in shaping the students into capable, compassionate and responsible individuals with a high degree of social responsibility.

## Programme Outcomes

| No.         | Programme Outcomes (POs)   |
|-------------|--|
| <b>PO-1</b> | <b>Critical thinking</b> <ul style="list-style-type: none"><li>○ analyze information objectively and make a reasoned judgment</li><li>○ draw reasonable conclusions from a set of information, and discriminate between useful and less useful details to solve problems or make decisions</li><li>○ identify logical flaws in the arguments of others</li><li>○ evaluate data, facts, observable phenomena, and research findings to draw valid and relevant results that are domain-specific</li></ul> |
| <b>PO-2</b> | <b>Complex problem-solving</b> <ul style="list-style-type: none"><li>○ solve different kinds of problems in familiar and no-familiar contexts and apply the learning to real-life situations</li><li>○ analyze a problem, generate and implement a solution and to assess the success of the plan</li></ul>  |

|             |   |
|-------------|---|
|             | <ul style="list-style-type: none"> <li>○ understand how the solution will affect both the people involved and the surrounding environment</li> </ul>  |
| <b>PO-3</b> | <p><b>Creativity</b></p> <ul style="list-style-type: none"> <li>○ produce or develop original work, theories and techniques</li> <li>○ think in multiple ways for making connections between seemingly unrelated concepts or phenomena</li> <li>○ add a unique perspective or improve existing ideas or solutions</li> <li>○ generate, develop and express original ideas that are useful or have values</li> </ul>         |
| <b>PO-4</b> | <p><b>Communication skills</b></p> <ul style="list-style-type: none"> <li>○ convey or share ideas or feelings effectively</li> <li>○ use words in delivering the intended message with utmost clarity</li> <li>○ engage the audience effectively</li> <li>○ be a good listener who are able to understand, respond and empathize with the speaker</li> <li>○ confidently share views and express himself/herself</li> </ul> |
| <b>PO-5</b> | <p><b>Leadership qualities</b></p> <ul style="list-style-type: none"> <li>○ work effectively and lead respectfully with diverse teams</li> <li>○ build a team working towards a common goal</li> <li>○ motivate a group of people and make them achieve the best possible solution.</li> <li>○ help and support others in their difficult times to tide over the adverse situations with courage</li> </ul>                 |
| <b>PO-6</b> | <p><b>Learning ‘how to learn’ skills</b></p> <ul style="list-style-type: none"> <li>○ acquire new knowledge and skills, including ‘learning how to learn skills, that are necessary for pursuing learning activities</li> </ul>   |

|             |   |
|-------------|---|
|             | <p>throughout life, through self-paced and self-directed learning</p> <ul style="list-style-type: none"> <li>○ work independently, identify appropriate resources required for further learning</li> <li>○ acquire organizational skills and time management to set self-defined goals and targets with timelines</li> <li>○ inculcate a healthy attitude to be a lifelong learner</li> </ul>   |
| <b>PO-7</b> | <p><b>Digital and technological skills</b></p> <ul style="list-style-type: none"> <li>○ use ICT in a variety of learning and work situations, access, evaluate, and use a variety of relevant information sources</li> <li>○ use appropriate software for analysis of data</li> <li>○ understand the pitfalls in the digital world and keep safe from them</li> </ul>   |
| <b>PO-8</b> | <p><b>Value inculcation</b></p> <ul style="list-style-type: none"> <li>○ embrace and practice constitutional, humanistic, ethical, and moral values in life including universal human values of truth, righteous conduct, peace, love, nonviolence, scientific temper, citizenship values</li> <li>○ formulate a position/argument about an ethical issue from multiple perspectives</li> <li>○ identify ethical issues related to work, and follow ethical practices, including avoiding unethical behaviour such as fabrication, falsification or misrepresentation of data, or committing plagiarism, and adhering to intellectual property rights</li> <li>○ adopt an objective, unbiased, and truthful actions in all aspects of work</li> </ul> |

## Programme Specific Outcomes

| <b>No.</b> | <b>Upon completion of the programme the graduate will be able to</b>  | <b>PO No.</b> |
|------------|---|---------------|
| PSO-1      | Understand the basic concepts of different branches of Geography  | PO-1, PO-4    |
| PSO-2      | Identifies the relationship and impact of human-nature interaction  | PO-2, PO-3    |
| PSO-3      | Performs procedures of different methods of data collection, data interpretation, data analysis, and display/Output | PO-6, PO-7    |
| PSO-4      | Build leadership qualities towards a common goal and inculcate values   | PO-5, PO-8    |

## Programme Structure

| <b>GEOGRAPHY</b>                 |   |               |
|----------------------------------|---|---------------|
| <b>COURSE CODE</b>               | <b>NAME OF THE COURSE</b>                     | <b>CREDIT</b> |
| <b>SEMESTER I</b>                |   |               |
| <b>Discipline Specific Core</b>  |   |               |
| UK1DSCGGY100                     | Geomorphology                                 | 4             |
| UK1DSCGGY101                     | Fluvial and Coastal Geomorphology             | 4             |
| UK1DSCGGY102                     | Earth Structure and tectonics                 | 4             |
| UK1DSCGGY103                     | General Geography                             | 4             |
| UK1DSCGGY104                     | Geography of Tourism                          | 4             |
| UK1DSCGGY105                     | Medical Geography                             | 4             |
| <b>Multi-Disciplinary Course</b> |   |               |
| UK1MDCGGY100                     | Introduction to Geopolitics                   | 3             |
| UK1MDCGGY101                     | Introduction to Earth Science and Environment | 3             |
| <b>SEMESTER II</b>               |   |               |
| <b>Discipline Specific Core</b>  |   |               |
| UK2DSCGGY100                     | Climatology and Oceanography                  | 4             |
| UK2DSCGGY101                     | Climatology                                   | 4             |
| UK2DSCGGY102                     | Global Climate and Climate Change             | 4             |
| UK2DSCGGY103                     | Tropical Meteorology                          | 4             |
| UK2DSCGGY104                     | Biogeography                                  | 4             |
| UK2DSCGGY105                     | Fundamentals of Economic Geography            | 4             |
| UK2DSCGGY106                     | Population Geography                          | 4             |
| <b>Multi-Disciplinary Course</b> |   |               |
| UK2MDCGGY100                     | Introduction to Climate Change and Mitigation | 3             |
| UK2MDCGGY101                     | Introduction to Disaster Management           | 3             |
| <b>SEMESTER III</b>              |   |               |
| <b>Discipline Specific Core</b>  |   |               |
| UK3DSCGGY200                     | Environmental Geography                       | 4             |
| UK3DSCGGY201                     | Oceanography                                  | 4             |
| UK3DSCGGY202                     | Coastal and Estuarine Oceanography            | 4             |
| UK3DSCGGY203                     | Physical and Cultural Geography of India      | 4             |
| UK3DSCGGY204                     | Kerala - Land and People                      | 4             |
| UK3DSCGGY205                     | Natural resource management in India          | 4             |
| UK3DSCGGY206                     | Water Resource Management in Kerala           | 4             |

| <b>Discipline Specific Elective</b>             |   |   |
|---|---|---|
| UK3DSEGGY200                                    | Information Technology in Geosciences                       | 4 |
| UK3DSEGGY201                                    | Basic Geodesy   | 4 |
| UK3DSEGGY202                                    | Introduction to Hazards and Disasters                       | 4 |
| UK3DSEGGY203                                    | Rural Natural Resources-Ecology and Sustainable Development | 4 |
| UK3DSEGGY204                                    | Urban Geography   | 4 |
| <b>Value Added Course</b>                       |   |   |
| UK3VACGGY200                                    | Geography of Health and Environment                         | 3 |
| <b>SEMESTER IV<br/>Discipline Specific Core</b> |   |   |
| UK4DSCGGY200                                    | Fundamentals of Remote Sensing                              | 4 |
| UK4DSCGGY201                                    | Geographic Information System                               | 4 |
| <b>Discipline Specific Elective</b>             |   |   |
| UK4DSEGGY200                                    | Aerial Photography and Photogrammetry                       |   |
| UK4DSEGGY201                                    | Principles of Surveying and Levelling                       | 4 |
| UK4DSEGGY202                                    | Disaster Preparedness, Prevention and Mitigation            | 4 |
| UK4DSEGGY203                                    | Settlement Geography  | 4 |
|   | Summer Internship (Mandatory)                               | 2 |
| <b>Skill Enhancement Course</b>                 |   |   |
| UK4SECGGY200                                    | Introduction to Maps  | 3 |
| <b>Value Added Course</b>                       |   |   |
| UK4VACGGY200                                    | Environmental Ethics  | 3 |
| UK4VACGGY201                                    | Water Resource Management                                   | 3 |
| <b>SEMESTER V<br/>Discipline Specific Core</b>  |   |   |
| UK5DSCGGY300                                    | Geography of India  | 4 |
| UK5DSCGGY301                                    | Physical Geography of India                                 | 4 |
| UK5DSCGGY302                                    | India-Social and Economic Geography                         | 4 |
| UK5DSCGGY303                                    | Disaster Management   | 4 |
| UK5DSCGGY304                                    | Human Geography   | 4 |
| <b>Discipline Specific Elective</b>             |   |   |
| UK5DSEGGY300                                    | Thermal and Microwave Remote Sensing                        | 4 |
| UK5DSEGGY301                                    | Digital Image Processing                                    | 4 |



|  |   |   |
|--|---|---|
| UK5DSEGGY302                                     | Topographic and Hydrographic Surveying              | 4 |
| UK5DSEGGY303                                     | Disaster Response, Recovery and Reconstruction      | 4 |
| UK5DSEGGY304                                     | Disaster Risk Reduction and Vulnerability Analysis  | 4 |
| UK5DSEGGY305                                     | Rural and Urban Settlement Geography                | 4 |
| UK5DSEGGY306                                     | Rural and Urban Development Theories and            | 4 |
| UK5DSCGGY307                                     | Geography of Migration                              | 4 |
| UK5DSEGGY308                                     | Agricultural Geography                              | 4 |
| <b>Skill Enhancement Course</b>                  |   |   |
| UK5SECGGY300                                     | Introduction to Geospatial Technology               | 3 |
| <b>SEMESTER VI<br/>Discipline Specific Core</b>  |   |   |
| UK6DSCGGY300                                     | Cartography   | 4 |
| UK6DSCGGY301                                     | Geography of Kerala                                 | 4 |
| UK6DSCGGY302                                     | World Regional Geography                            | 4 |
| UK6DSCGGY303                                     | Economic Geography                                  | 4 |
| <b>Discipline Specific Elective</b>              |   |   |
| UK6DSEGGY300                                     | Global Positioning System                           | 4 |
| UK6DSEGGY301                                     | Remote Sensing and GIS in Land Use Analysis         | 4 |
| UK6DSEGGY302                                     | Remote Sensing and GIS in Water Resource Management | 4 |
| UK6DSEGGY303                                     | Database Management System                          | 4 |
| UK6DSEGGY304                                     | Disaster Management Framework                       | 4 |
| UK6DSEGGY305                                     | Climate Change and Environmental Disasters          | 4 |
| UK6DSEGGY306                                     | Urban Design and Morphology                         | 4 |
| UK6DSEGGY307                                     | Urban Ecology and Environmental Planning            | 4 |
| UK6DSEGGY308                                     | Evolution of Geographical Thought                   | 4 |
| UK6DSEGGY309                                     | Soil Geography                                      | 4 |
| <b>Skill Enhancement Course</b>                  |   |   |
| UK6SECGGY300                                     | GIS for Environment and Human Resources Management  | 3 |
| <b>SEMESTER VII<br/>Discipline Specific Core</b> |   |   |
| UK7DSCGGY400                                     | Research Methodology                                | 4 |
| UK7DSCGGY401                                     | Spatial Planning                                    | 4 |
| UK7DSCGGY402                                     | Environmental Management and Impact Assessment      | 4 |
| UK7DSCGGY300                                     | Map Reading and Analysis                            | 4 |

|  |   |    |
|--|---|----|
| UK7DSCGGY301   | Earth Positioning Systems                           | 4  |
| UK7DSCGGY302   | Geography of Environment                            | 4  |
| <b>Discipline Specific Elective</b>  |   |    |
| UK7DSEGGY400   | Spatial Data Analysis and Geostatistics             | 4  |
| UK7DSEGGY401   | Digital Surveying                                   | 4  |
| UK7DSEGGY402   | Disasters and Environmental Strategic Assessment    | 4  |
| UK7DSEGGY403   | Sustainable City Planning                           | 4  |
| UK7DSEGGY404   | Hydrology   | 4  |
| <b>SEMESTER VIII<br/>Discipline Specific Core</b>  |   |    |
| UK8DSCGGY400   | ONLINE  | 4  |
| UK8DSCGGY401   | ONLINE  | 4  |
| <b>Mandatory for UG Hons with Research</b>   |   |    |
| UK8RPHGGY400   | Research Project                                    | 12 |
| <b>Mandatory for UG Hons</b>   |   |    |
| UK8CIPGGY400   | Internship Project                                  | 12 |
| <b>Specialisation in Remote Sensing and GIS</b><br>(Students must opt any four courses given below to obtain specialisation) |   |    |
| UK3DSEGGY200   | Information Technology in Geosciences               | 4  |
| UK4DSEGGY200   | Aerial Photography and Photogrammetry               | 4  |
| UK5DSEGGY300   | Thermal and Microwave Remote Sensing                | 4  |
| UK5DSEGGY301   | Digital Image Processing                            | 4  |
| UK6DSEGGY300   | Global Positioning System                           | 4  |
| UK6DSEGGY301   | Remote Sensing and GIS in Land Use Analysis         | 4  |
| UK6DSEGGY302   | Remote Sensing and GIS in Water Resource Management | 4  |
| <b>Specialisation in Digital Surveying</b> (Students must opt any four courses given below to obtain specialisation)         |   |    |
| UK3DSEGGY201   | Basic Geodesy                                       | 4  |
| UK4DSEGGY201   | Principles of Surveying and Levelling               | 4  |
| UK5DSEGGY301   | Digital Image Processing                            | 4  |
| UK5DSEGGY302   | Topographic and Hydrographic Surveying              | 4  |
| UK6DSEGGY300   | Global Positioning System                           | 4  |
| UK6DSEGGY303   | Database Management System                          | 4  |
| UK7DSEGGY401   | Digital Surveying                                   | 4  |
| <b>Specialisation in Disaster Management</b><br>(Students must opt any four courses given below)                             |   |    |

|              |  |   |
|--------------|--|---|
|              | to obtain specialisation)  |   |
| UK3DSEGGY202 | Introduction to Hazards and Disasters  | 4 |
| UK4DSEGGY202 | Disaster Preparedness, Prevention and Mitigation   | 4 |
| UK5DSEGGY303 | Disaster Response, Recovery and Reconstruction   | 4 |
| UK5DSEGGY304 | Disaster Risk Reduction and Vulnerability Analysis   | 4 |
| UK6DSEGGY304 | Disaster Management Framework  | 4 |
| UK6DSEGGY305 | Climate Change and Environmental Disasters   | 4 |
| UK7DSEGGY402 | Disasters and Environmental Strategic Assessment   | 4 |
|              | <b>Specialisation in Urban and Rural Planning</b><br>(Students must opt any four courses given below to obtain specialisation) |   |
| UK3DSEGGY203 | Rural Natural Resources and Sustainable Development  | 4 |
| UK4DSEGGY200 | Aerial Photography and Photogrammetry  | 4 |
| UK5DSEGGY305 | Rural and Urban Settlement Geography   | 4 |
| UK5DSEGGY306 | Rural and Urban Development Theories and Approaches  | 4 |
| UK6DSEGGY306 | Urban Design and Urban Morphology  | 4 |
| UK6DSEGGY307 | Urban Ecology and Environmental Planning   | 4 |
| UK7DSEGGY403 | Sustainable City Planning  | 4 |

Geography Practicals have to be conducted in separate batches and the student's strength in one practical batch is limited to 16. Practicals with field survey have to be conducted in separate batches with one teacher will be overall in charge, while two others will have to assist in the field and lab work.



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK1DSCGGY100</b>   |                  |                   |                    |                  |
| Course Title   | <b>GEOMORPHOLOGY</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>  |                  |                   |                    |                  |
| Semester       | I   |                  |                   |                    |                  |
| Academic Level | 100-199   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites | A Pass in Higher Secondary Examination of the state or an Examination accepted by the University as equivalent thereto. Must have studied either Geography as one of the Optional subjects or any of the following subjects, Mathematics, Geology, Chemistry, Physics, Statistics and Computer Science. |                  |                   |                    |                  |
| Course Summary | It covers the various theories on the origin and evolution of earth, different endogenetic and exogenetic processes and resultant landforms   |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                 | Content  | Hrs |
|------------|--------------------------------------|--|-----|
| <b>I</b>   | <b>Introduction to Geomorphology</b> |  | 8   |
|            | 1                                    | Introduction to Geography: Physical and Human Geography  |     |
|            | 2                                    | Theories regarding Origin and Evolution of Universe/ Solar System – Big Bang Theory, Steady State Theory Nebular Hypothesis and Tidal Hypothesis           |     |
|            | 3                                    | The size and shape of Earth  |     |
| <b>II</b>  | <b>The Dynamics of Earth</b>         |  | 10  |
|            | 4                                    | Structure and Composition of Earth   |     |
|            | 5                                    | Continental Drift Theory, Sea Floor Spreading; Plate tectonics   |     |
|            | 6                                    | Introduction to Geomorphic processes: Exogenetic and Endogenetic forces  |     |
|            | 7                                    | Forces of Compression and tension : Folding and Faulting   |     |
|            | 8                                    | Volcanoes: Classification based on the mode and periodicity of eruption  |     |
| <b>III</b> | <b>Exogenetics Processes</b>         |  | 8   |
|            | 10                                   | Rocks : Characteristics and types – Igneous, Sedimentary and Metamorphic - Rock Cycle  |     |
|            | 11                                   | Weathering: Types and controlling factors  |     |
|            | 12                                   | Mass movement: Meaning, Controlling factors – Types: Slow movements: Solifluction, creep; Sudden movements: Mud flow, land slide, rock fall and avalanches |     |
| <b>IV</b>  | <b>Evolution of Landforms</b>        |  | 10  |

|          |                              |   |   |
|----------|------------------------------|---|---|
|          | 13                           | Concept of cycle of erosion: W M Davis  |   |
|          | 14                           | Evolution of Landforms: Erosional and depositional; Fluvial, Karst, Aeolian, Glacial and coastal.       |   |
|          | <b>Applied Geomorphology</b> |   |   |
| <b>V</b> | 15                           | Application of geomorphology: Regional planning, transportation, mining, hazard management, agriculture | 9 |

## PRACTICALS

(30 hours)

**Exercise 1:** Identification of Rocks and Minerals; Rock Samples: Granite, Basalt, Limestone, Sandstone, Quartzite and Marble. Mineral samples; Iron ore, Bauxite ore and Manganese.

**Exercise 2:** Strahler's stream ordering - Bifurcation ratio, Drainage density

**Exercise 3:** Identification of drainage pattern from toposheets

**Exercise 4:** Latitude and Longitude- Calculation of Time

**Exercise 5:** Field Trips or Virtual tools to observe landforms in real world settings

## References

- Arthur N Strahler and Alan N Strahler (1998) Modern Physical Geography, John Wiley & Sons, Inc.
- Bloom, A.L. (1991): Geomorphology, 2nd Ed Englewood Cliffs, M.J.Prentice Hall
- Briggs, K.(1985): Physical Geography Process and System, Hodder and Stoughton, London
- Chorley, R.J. Schumm, S A & Sugden, D E (1985): Geomorphology, Methuen & Co. Ltd., London, New York.
- Cook, R.U. & Doornkamp, J C (1974): Geomorphology in Environmental Management, an Introduction. Clarendon Press. Oxford
- John P Miller and Luna Berger Leopold, Fluvial Processes in Geomorphology
- Morgan, R.S. & Wooldridge S.W (1959) : Outline of Geomorphology the Physical basis of Geography, Longmans Green, London
- Richard John Hagget (2003) Fundamentals of Geomorphology, Routledge, London.
- Strahler, A.N. (1992): Physical Geography. John Wiley & Sons Inc., New York.
- William D. Thornbury. (2010): Principles of Geomorphology

## Web References

- <https://www.britannica.com/science/geomorphology>
- [http://www.geomorph.org/wp-content/uploads/2016/06/10\\_reasons\\_Geomorphology.pdf](http://www.geomorph.org/wp-content/uploads/2016/06/10_reasons_Geomorphology.pdf)
- <https://www.space.com/17638-how-big-is-earth.html>
- <https://courses.lumenlearning.com/suny-geophysical/chapter/the-composition-and-structure-of-earth/>
- <https://education.nationalgeographic.org/resource/resource-library-earth-structure/>

- <https://www.usgs.gov/programs/VHP/about-volcanoes>
- <https://education.nationalgeographic.org/resource/resource-library-earthquake/>
- <https://education.nationalgeographic.org/resource/rock-cycle/>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand origin and evolution of Universe                | U               | PSO-1         |
| CO-2 | Critically analyse Continental Drift and Plate Tectonics   | An              | PSO-3         |
| CO-3 | Identify major Earthquake and Volcanic Zones of the Earth  | R               | PSO-2         |
| CO-4 | Appreciate and evaluate various endogenic processes        | E               | PSO-3         |
| CO-5 | Critical Analysis of Exogenic Processes and Soil Formation | An              | PSO-4         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: GEOMORPHOLOGY**

**Credits: 4:0:0 (Lecture:Tutorial: Practical)**

| CO No. | CO   | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|--------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand origin and evolution of Universe                | PSO-1  | U               | F                  | L                        | P             |
| 2      | Critically analyse Continental Drift and Plate Tectonics   | PSO-3  | An              | C                  | L                        | -             |
| 3      | Identify major Earthquake and Volcanic Zones of the Earth  | PSO-2  | R               | F                  | L                        | -             |
| 4      | Appreciate and evaluate various endogenic processes        | PSO-3  | E               | M                  | L                        | -             |
| 5      | Critical Analysis of Exogenic Processes and Soil Formation | PSO-4  | An              | P                  | L                        | P             |

**F-Factual, C- Conceptual, P-Procedural, M- Metacognitive**

**Mapping of COs with PSOs and POs :**

|      | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | 2    | 1    | -    | -    | -   | -   | -   | -   | -   | -   | -   | -   |
| CO 2 | 1    | -    | 3    | -    | 3   | -   | 1   | -   | -   | -   | -   | -   |
| CO 3 | 2    | 3    | 1    | -    | -   | -   | -   | -   | -   | -   | -   | -   |
| CO 4 | -    | -    | 3    | 2    | -   | -   | 2   | -   | -   | -   | -   | -   |
| CO 5 | -    | -    | -    | 2    | -   | 3   | -   | -   | -   | -   | -   | -   |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             | ✓          |            |                           |



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|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK1DSCGGY101</b>  |                  |                   |                    |                  |
| Course Title   | <b>FLUVIAL AND COASTAL GEOMORPHOLOGY</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | <b>I</b>   |                  |                   |                    |                  |
| Academic Level | 100-199  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites | A Pass in Higher Secondary Examination of the state or an Examination accepted by the University as equivalent thereto. Must have studied either Geography as one of the Optional subjects or any of the following subjects, Mathematics, Geology, Chemistry, Physics, Statistics, Computer Science. |                  |                   |                    |                  |
| Course Summary | It covers the various aspects of fluvial and coastal landforms; It also deals with the human influence on these particular environments.   |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content  | Hrs |
|------------|--|--|-----|
| <b>I</b>   | <b>Fluvial Geomorphology</b>                       |  | 8   |
|            | 1  | Introduction to Geomorphology- Meaning and concepts  |     |
|            | 2  | Fluvial geomorphology – meaning and concepts- Streams: Perennial, intermittent and ephemeral                 |     |
|            | 3  | Fluvial Processes – Flowing water, Splash, Overland flow, Rill flow, Subsurface flow, Springs, Stream flow   |     |
|            | 4  | Stream load – types, Stream erosion and transport, Stream deposition.  |     |
| <b>II</b>  | <b>Fluvial Landforms</b>                           |  | 10  |
|            | 5  | Fluvial Erosional Landforms  |     |
|            | 6  | Fluvial depositional landforms   |     |
|            | 7  | Normal Cycle of Erosion by W M Davis   |     |
| <b>III</b> | <b>Drainage Basins &amp; River Channel Network</b> |  | 8   |
|            | 8  | Drainage basins- Stream Channel Ordering – Strahler’s Ordering System – Bifurcation Ratio – Drainage Density |     |
|            | 9  | Drainage Patterns: Genetic Classification; classification based on underlying geology of an area.            |     |
| <b>IV</b>  | <b>Coastal Geomorphology</b>                       |  | 10  |
|            | 10   | Coast: Definition and classification   |     |
|            | 11   | Waves: Types; Nearshore currents; Tides  |     |
|            | 12   | Coastal Processes: Degradational and Aggradational   |     |
|            | 13   | Coastal Erosional landforms; Coastal depositional landforms  |     |
| <b>V</b>   | <b>Applied Geomorphology</b>                       |  | 9   |
|            | 14   | Human impact on Fluvial system; Impact of sand mining  |     |
|            | 15   | Human impact on Coast; Coastal issues with special reference to Beach  |     |



|    |                   |  |
|----|-------------------|--|
|    | erosion in Kerala |  |
| 16 | Sea level changes |  |

## PRACTICALS

(30 hours)

**Exercise 1:** Drainage basin analysis- Delineation of basins – Subdivisions

**Exercise 2:** Strahler’s stream ordering - Bifurcation ratio, Drainage density

**Exercise 3:** Identification of drainage patterns from topsheet.

**Exercise 4:** Field Trips or Virtual tools to observe and map fluvial and coastal landforms.

## References

- Arthur N Strahler and Alan N Strahler (1998) Modern Physical Geography, John Wiley & Sons, Inc.
- Richard John Hagget (2003) Fundamentals of Geomorphology, Routledge, London.
- Bloom, A.L. (1991): Geomorphology, 2<sup>nd</sup> Ed Englewood Cliffs, M.J.Prentice Hall
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- Chorley, R.J. Schumm, S A & Sugden, D E (1985): Geomorphology, Methuen & Co. Ltd., London, New York.
- Cook, R.U. & Doornkamp, J C (1974): Geomorphology in Environmental Management, an Introduction. Clarendon Press. Oxford
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- Strahler, A.N. (1992): Physical Geography. John Wiley & Sons Inc., New York.
- William D. Thornbury. (2010): Principles of Geomorphology

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- [https://www.researchgate.net/publication/343975477\\_Coastal\\_Erosion\\_in\\_Kerala](https://www.researchgate.net/publication/343975477_Coastal_Erosion_in_Kerala)

**Course Outcomes**

| <b>No.</b> | <b>Upon completion of the course the graduate will be able to</b>         | <b>Cognitive Level</b> | <b>PSO addressed</b> |
|------------|---|------------------------|----------------------|
| CO-1       | Understand the basics of fluvial and coastal geomorphology                | U                      | PSO-1                |
| CO-2       | Analyse and evaluate drainage basins                                      | An, E                  | PSO-1                |
| CO-3       | Identify and appreciate various fluvial and coastal landforms             | R                      | PSO-1, 3             |
| CO-4       | Apply geomorphic knowledge in fluvial and coastal environments            | Ap                     | PSO-3                |
| CO-5       | Critically evaluate the human impact on fluvial and coastal environments. | E                      | PSO-2,               |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: FLUVIAL AND COASTAL GEOMORPHOLOGY**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| <b>CO No.</b> | <b>CO</b>   | <b>PO/PSO</b> | <b>Cognitive Level</b> | <b>Knowledge Category</b> | <b>Lecture (L)/Tutorial (T)</b> | <b>Practical (P)</b> |
|---------------|---|---------------|------------------------|---------------------------|---------------------------------|----------------------|
| 1             | Understand the basics of fluvial and coastal geomorphology                | PSO-1         | U                      | F,C                       | L                               | -                    |
| 2             | Analyse and evaluate drainage basins                                      | PSO-1         | An, E                  | F,M                       | L                               | P                    |
| 3             | Identify and appreciate various fluvial and coastal landforms             | PSO-1, 3      | R                      | F                         | L                               | P                    |
| 4             | Apply geomorphic knowledge in fluvial and coastal environments            | PSO-3         | Ap                     | M                         | L                               | -                    |
| 5             | Critically evaluate the human impact on fluvial and coastal environments. | PSO-2,        | E                      | M                         | L                               | -                    |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive  
Mapping of COs with PSOs and POs :**

|             | PS<br>O1 | PS<br>O2 | PS<br>O3 | PS<br>O4 | PO<br>1 | PO<br>2 | PO<br>3 | PO<br>4 | PO<br>5 | PO<br>6 | PO<br>7 | PO<br>8 |
|-------------|----------|----------|----------|----------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>CO 1</b> | 3        | -        | -        | -        | 3       | -       | -       | -       | -       | -       | -       | -       |
| <b>CO 2</b> | 3        | -        | -        | -        | 3       |         |         | -       | -       | -       | -       | -       |
| <b>CO 3</b> | 2        | -        | 2        | -        | 1       |         | 2       | -       | -       | -       | -       | -       |
| <b>CO 4</b> | -        | -        | 2        | -        | 1       |         | 2       | -       | -       | -       | -       | -       |
| <b>CO 5</b> | -        | 3        | -        | -        | 3       |         | 1       | -       | -       | -       | -       | -       |

**Assessment Rubrics:**

- Quiz / Assignment / Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             |            |            |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK1DSCGGY102</b>  |                  |                   |                    |                  |
| Course Title   | <b>EARTH STRUCTURE AND TECTONICS</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | <b>I</b>   |                  |                   |                    |                  |
| Academic Level | 100-199  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites | A Pass in Higher Secondary Examination of the state or an Examination accepted by the University as equivalent thereto. Must have studied either Geography as one of the Optional subjects or any of the following subjects, Mathematics, Geology, Chemistry, Physics, Statistics, Computer Science. |                  |                   |                    |                  |
| Course Summary | It deals with the structure and composition of the Earth, folding and faulting, plate tectonics and tectonic disasters   |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content  | Hrs |
|------------|--|--|-----|
| <b>I</b>   | <b>Global Seismology &amp; Composition Of Earth's Interior</b> |  | 8   |
|            | 1  | Evidence for Earth's interior- Direct and indirect sources; Seismic waves; Seismic discontinuities |     |
|            | 2  | Seismic velocity and density structure of Earth; Evidence for fluid outer core                     |     |
|            | 3  | Structure and Composition of the Earth- crust, mantle, and core                                    |     |
| <b>II</b>  | <b>Mantle And Core Dynamics</b>                                |  | 10  |
|            | 4  | Elementary theory of convection; convection cells; Rayleigh number; viscosity                      |     |
|            | 5  | Mantle convection; Mantle plumes   |     |
| <b>III</b> | <b>Folding &amp; Faulting</b>                                  |  | 8   |
|            | 6  | Forces of compression: Folding and types of fold   |     |
|            | 7  | Forces of tension: Faulting and types of faults; Block mountains and rift valley.                  |     |
| <b>IV</b>  | <b>Plate Tectonics</b>   |  | 10  |
|            | 8  | Plate tectonics: Historical background   |     |
|            | 9  | Tectonic plates; driving force of plate tectonics  |     |
|            | 10   | Plate movements and plate boundaries   |     |
|            | 11   | Seafloor spreading   |     |
| <b>V</b>   | <b>Geo Tectonics And Disasters</b>                             |  | 9   |
|            | 12   | Volcanism – Definitions; Parts of volcano; Classification based on frequency of eruption           |     |
|            | 13   | Earthquakes – Definition; types; Measurement scales  |     |
|            | 14   | Pacific Rim: Tectonic significance   |     |

## PRACTICALS

(30 hours)

**Exercise 1:** Identification of Rocks and minerals; Rock samples: Granite, Basalt, Limestone, Sandstone, Quartzite and marble; Mineral samples: Iron ore, Bauxite and Manganese.

**Exercise 2:** Illustration of fold and fault – Field visit of any fold/fault site

**Exercise 3:** Calculation of Richter magnitude using P and S wave

**Exercise 4:** Latitude and Longitude- Calculation of Time

**Exercise 5:** A case study of recent volcanic eruption/ earthquake

## References

- A Mussett and A Khan (2000) Looking into the Earth, Cambridge University Press
- CMR Fowler (1990) Solid Earth, Cambridge University Press
- Arthur N Strahler and Alan N Strahler (1998) Modern Physical Geography, John Wiley & Sons, Inc.
- Richard John Hagget (2003) Fundamentals of Geomorphology, Routledge, London.
- Bloom, A.L. (1991): Geomorphology, 2<sup>nd</sup> Ed Englewood Cliffs, M.J.Prentice Hall
- Briggs, K.(1985): Physical Geography Process and System, Hodder and Stoughton, London
- Cook, R.U. & Doornkamp, J C (1974): Geomorphology in Environmental Management, an Introduction. Clarendon Press. Oxford
- John P Miller and Luna Berger Leopold, Fluvial Processes in Geomorphology
- Morgan, R.S. & Wooldridge S.W (1959) : Outline of Geomorphology the Physical basis of Geography, Longmans Green, London
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- <https://education.nationalgeographic.org/resource/hot-spots/>
- <https://www.uh.edu/~geos6g/1330/struct.html>
- <https://www.britannica.com/science/plate-tectonics>
- <https://fastercapital.com/content/Tectonic-Plates>

**Course Outcomes**

| <b>No.</b> | <b>Upon completion of the course, the graduate will be able to</b>   | <b>Cognitive Level</b> | <b>PSO addressed</b> |
|------------|--|------------------------|----------------------|
| CO-1       | Understand the structure and composition of the earth  | U                      | PSO - 1              |
| CO-2       | Remember the types of fold and faults  | R                      | PSO - 1              |
| CO-3       | Analyse geological and geophysical data to understand Earth structure and processes.                                 | An                     | PSO - 3              |
| CO-4       | Explain and evaluate the relationships between earth's structure, composition, physical behaviour and earth dynamics | E                      | PSO – 2, 3           |
| CO-5       | Apply the geographic knowledge on the tectonic significance of the Pacific Rim                                       | Ap                     | PSO - 3              |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: EARTH STRUCTURE AND TECTONICS**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| <b>CO No.</b> | <b>CO</b>  | <b>PO/PSO</b> | <b>Cognitive Level</b> | <b>Knowledge Category</b> | <b>Lecture (L)/Tutorial(T)</b> | <b>Practical(P)</b> |
|---------------|--|---------------|------------------------|---------------------------|--------------------------------|---------------------|
| CO-1          | Understand the structure and composition of the earth  | PSO - 1       | U                      | F                         | L                              | -                   |
| CO-2          | Remember the types of fold and faults  | PSO - 1       | R                      | F, C                      | L                              | -                   |
| CO-3          | Analyse geological and geophysical data to understand Earth structure and processes.                                 | PSO - 3       | An                     | M                         | L                              | P                   |
| CO-4          | Explain and evaluate the relationships between earth's structure, composition, physical behaviour and earth dynamics | PSO – 2, 3    | E                      | M                         | L                              | -                   |

|      |  |         |    |   |   |   |
|------|--|---------|----|---|---|---|
| CO-5 | Apply the geographic knowledge on the tectonic significance of the Pacific Rim | PSO - 3 | Ap | P | L | P |
|------|--|---------|----|---|---|---|

F-Factual, C- Conceptual, P-Procedural, M- Metacognitive

### Mapping of COs with PSOs and POs :

| CO. No. | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|---------|-------|-------|-------|-------|-----|-----|-----|-----|-----|-----|-----|-----|
| CO 1    | 3     | 2     | -     | -     | 1   | -   | -   | 2   | -   | -   |     |     |
| CO 2    | 3     | 2     | -     | -     | 1   | -   | -   | 2   | -   | -   |     |     |
| CO 3    | -     | 1     | 3     | -     | -   | -   | -   | -   | -   | 2   |     |     |
| CO 4    | -     | 2     | 3     | -     | -   | -   | 2   | -   | -   | 1   | -   | 2   |
| CO 5    | -     | 1     | 3     | 2     | -   | 3   | -   | -   | -   | 2   | -   | 1   |

### Assessment Rubrics:

- Quiz / Assignment / Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

### Mapping of COs to Assessment Rubrics :

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             |            |            | ✓                         |
| CO 5 | ✓             | ✓          |            | ✓                         |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK1DSCGGY103</b>  |                  |                   |                    |                  |
| Course Title   | <b>GENERAL GEOGRAPHY</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | I  |                  |                   |                    |                  |
| Academic Level | 100-199  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2                  | 5                |
| Pre-requisites | A Pass in Higher Secondary Examination of the state or an Examination accepted by the University as equivalent thereto. Must have studied either Geography as one of the Optional subjects or any of the following subjects, Mathematics, Geology, Chemistry, Physics, Statistics, Computer Science.                     |                  |                   |                    |                  |
| Course Summary | General geography delves into the study of Earth's natural processes and phenomena, focusing on the interactions between the atmosphere, hydrosphere, lithosphere, and biosphere. This course provides students with a comprehensive understanding of the physical systems shaping the Earth's surface and environments. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Meaning and Concept of Geography</b>         |   | 10  |
|            | 1   | Meaning, Scope and branches of Geography  |     |
|            | 2   | Origin of the earth – Nebular Hypothesis – Tidal Hypothesis – Binary star Theory – Big Bang Theory                          |     |
|            | 3   | Size and Shape of the earth – Structure and composition of the earth  |     |
|            | 4   | Rotation and Revolution of the earth  |     |
| <b>II</b>  | <b>Geomorphic Processes and Earth Movements</b> |   | 10  |
|            | 6   | Exogenic and Endogenic forces   |     |
|            | 7   | Major relief features of the earth: - Mountains – Plains – Plateaus   |     |
|            | 8   | Types of Folds and Faults   |     |
|            | 9   | Volcano- Earthquakes- Continental drift theory and Plate tectonics  |     |
| <b>III</b> | <b>Agents of Gradation</b>                      |   | 7   |
|            | 11  | Erosional and Depositional landforms due to the work of running water, glaciers, wind, and underground water and sea waves. |     |
| <b>IV</b>  | <b>Fundamentals of Climatology</b>              |   | 9   |
|            | 12  | Atmosphere –composition-structure- Insolation – Temperature – Pressure – Wind   |     |
|            | 13  | Humidity – Forms of condensation -Types of precipitation  |     |
|            | 14  | Airmass – Fronts- Cyclones -Anticyclones  |     |



| <b>Principles of Oceanography</b> |    |   | 9 |
|-----------------------------------|----|---|---|
| <b>V</b>                          | 15 | Major Oceans- Bottom topography of oceans                           |   |
|                                   | 16 | Properties of ocean water -Temperature – Salinity- Currents – Tides |   |
|                                   | 17 | Coral reefs and ocean deposits                                      |   |

## **PRACTICALS**

**(30 hours)**

**Exercise 1:** Latitude and Longitude – Calculation of Time – International Dateline – Seasons

**Exercise 2:** Illustration of Folds and Faults

**Exercise 3:** Diagrammatic representation of Erosional and Depositional landform features produced by Running water, Glacier, Wind, Underground water and Waves

**Exercise 4:** Study of Meteorological Signs and Symbols – Weather Station model – Illustration of Fronts and Cyclones

**Exercise 5:** Illustration of Bottom Relief of Ocean Floor – Currents of Pacific, Atlantic and Indian Ocean

## **References**

- Bloom A. L., 2003: Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, New Delhi.
- Christopherson, Robert W., (2011), Geosystems: An Introduction to Physical Geography, 8 Ed., Macmillan Publishing Company
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- Ashish Sarkar, A Practical Geography, January 2015, Orient Black swan Private Limited- New Delhi
- Singh R L: Elements of Practical Geography, Kalyani Publishers.
- Gopal Singh: Map work and Practical Geography, Vikas Publishing House Pvt.. Ltd
- MZA Khan: Text Book of Practical Geography, Concept Publishing House.

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- <https://www.britannica.com/science/latitude>

- <https://www.bbc.co.uk/bitesize/topics/z849q6f/articles/zd9cxyc#zdbyvwx>
- <https://www.britannica.com/science/tropical-cyclone/Life-of-a-cyclone>
- <https://geographicbook.com/ocean-bottom-relief/>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to  | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understand the basics of geography and create knowledge of origin and evolution of the Universe                             | U, C            | PSO-1,2       |
| CO-2 | Understand the process of forces acting on the earth surfaces and able to evaluate various endogenic and exogenic processes | U, E            | PSO-1,2       |
| CO-3 | Acquire knowledge and understand the process of gradation, and evaluate the various agents of gradation                     | U, E            | PSO-1,2       |
| CO-4 | Ability to analyse weather elements such as temperature, precipitation, humidity and atmospheric circulation pattern        | An              | PSO-1,3       |
| CO-5 | Analyse the physical properties of ocean including temperature, salinity, currents, waves etc.                              | An              | PSO-1         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: WATER RESOURCE MANAGEMENT**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the basics of geography and create knowledge of origin and evolution of the Universe                             | PSO-1,2 | U, C            | M, F               | L                        | -             |
| 2      | Understand the process of forces acting on the earth surfaces and able to evaluate various endogenic and exogenic processes | PSO-1,2 | U, E            | C, M               | L                        | P             |

|   |  |         |      |      |   |   |
|---|--|---------|------|------|---|---|
| 3 | Acquire knowledge and understand the process of gradation, and evaluate the various agents of gradation              | PSO-1,2 | U, E | C, C | L | P |
| 4 | Ability to analyse weather elements such as temperature, precipitation, humidity and atmospheric circulation pattern | PSO-1,3 | An   | F    | L | P |
| 5 | Analyse the physical properties of ocean including temperature, salinity, currents, waves etc.                       | PSO-1   | An   | F, P | L | P |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | 3     | -     | -     | 3    | 3    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | 3     | -     | -     | 3    | 3    | -    | -    | -    | -    | -    | -    |
| CO 3 | 3     | 2     | -     | -     | 3    | 1    | -    | -    | -    | -    | -    | -    |
| CO 4 | 3     | -     | 2     | -     | 3    | 3    | -    | -    | -    | 2    | -    | -    |
| CO 5 | 3     | -     | -     | -     | 3    | 3    | -    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             | ✓          |            | ✓                         |
| CO 3 | ✓             | ✓          |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             | ✓          | ✓          |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK1DSCGGY104</b>  |                  |                   |                    |                  |
| Course Title   | <b>GEOGRAPHY OF TOURISM</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | I  |                  |                   |                    |                  |
| Academic Level | 100-199  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | The course focuses on importance of Geography in the field of Tourism. It covers nature and forms of tourism , factors affecting tourism ,types of accommodation, travel formalities, tourism impacts and some selected tourism destinations of Kerala |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                         | Content  | Hrs |
|------------|------------------------------|--|-----|
| <b>I</b>   | <b>Basics of Tourism</b>     |  | 10  |
|            | 1                            | Nature and scope of Tourism  |     |
|            | 2                            | Types of Tourism-Domestic tourism ,International tourism-Inbound and Outbound tourism  |     |
|            | 3                            | Forms of Tourism- Eco-Tourism, Cultural Tourism, Adventure tourism, Medical Tourism, Pilgrimage; Sustainable Tourism; MICE Tourism   |     |
|            | 4                            | Tourism map- Elements of map reading-Title, Scale, Directions, Symbols, Legends.   |     |
| <b>II</b>  | <b>Geography and Tourism</b> |  | 12  |
|            | 5                            | Importance of Geography in Tourism   |     |
|            | 6                            | Factors affecting tourism development - Physical Factors – Relief, Climate, Vegetation, Wildlife, Water Bodies. Socio-Cultural Factors, Religious Factors, Historical and Cultural Factors, Economic Factors. Transportation, Accommodation.   |     |
|            | 7                            | Types of Accommodation in Tourism :<br>Traditional accommodation – International hotels, Commercial hotels, Resort hotels, Floating hotels, Capsule hotels, Airport hotels;<br>Supplementary accommodation – Motels, Youth hostels, Camping sites, Tourist holiday villages, Bed and breakfast establishments. |     |
| <b>III</b> | <b>Travel Formalities</b>    |  | 7   |
|            | 8                            | Travel formalities-VISA, Passport, Credit cards, Vaccination certificates, Special permits   |     |
|            | 9                            | Tour itinerary   |     |
| <b>IV</b>  | <b>Tourism Impacts</b>       |  | 7   |
|            | 10                           | Economic impacts of Tourism ,Multiplier effect   |     |

|   |                            |   |   |
|---|----------------------------|---|---|
|   | 11                         | Socio-Cultural impacts of Tourism   |   |
|   | 12                         | Environmental impacts of Tourism  |   |
| V | <b>Tourism Attractions</b> |   | 9 |
|   | 13                         | Major natural attractions of Kerala- Silent Valley National Park, Gavi forest, Marayoor Sandalwood forests, Munnar, Agasthyakoodam Biological Park, Thattekad Bird Sanctuary. |   |
|   | 14                         | Major cultural attractions of Kerala-Bekal fort, Edakkal caves, Krishnapuram palace.  |   |

## PRACTICALS

**(30 Hours)**

**Exercise 1:** Field visit to local tourist spot and preparation of report

### References:

- Bhatia A.K.: International Tourism
- Bhatia A.K.: Tourism Development
- Gupta V.N.: Tourism in India
- RodaySunetra : Tourism operations and management.
- NegiJagmohan: Tourism Development and Resource Conservation.
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- Hall, M. and Stephen, P Geography of Tourism and Recreation – Environment, Place and Space, Routledge, London.
- Kamra, K. K. and Chand, M. Basics of Tourism: Theory, Operation and Practise
- Singh Jagbir “Eco-Tourism” Published by - I.K. International Pvt. Ltd

### Web References:

- <https://www.britannica.com/topic/tourism>
- <https://egyankosh.ac.in/bitstream/123456789/67178/3/Unit-4.pdf>
- <https://perpus.univpancasila.ac.id/repository/EBUPT180170.pdf>
- <https://opentextbc.ca/introtourism/chapter/chapter-3-accommodation/>
- [https://epgp.inflibnet.ac.in/epgpdata/uploads/epgp\\_content/S001827/P001829/M029341/ET/15242215697.34\\_Q1.pdf](https://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S001827/P001829/M029341/ET/15242215697.34_Q1.pdf)
- <https://www.iata.org/en/publications/newsletters/iata-knowledge-hub/the-most-important-travel-documents-for-your-trip/>
- <https://egyankosh.ac.in/bitstream/123456789/79515/1/Unit-1.pdf>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand tourism in all its dimensions.                  | U               | PSO-1         |
| CO-2 | Identifies the importance of travel geography              | R,U             | PSO-1, 2      |
| CO-3 | Analyses the formalities of travel                         | An              | PSO-1         |

|      |   |   |       |
|------|---|---|-------|
| CO-4 | Evaluate the significance of tourism in the cultural, social and economic milieu of geographic spaces | E | PSO-1 |
| CO-5 | Understand the existence and location of tourist spots and will be able to identify new tourist spots | U | PSO-2 |

**R-Remember, U-Understand, Ap-Appl, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: GEOGRAPHY OF TOURISM**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO  | PO/PSO   | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|----------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understands tourism in all its dimensions.  | PSO-1    | U               | F                  | L                        | -             |
| 2      | Identifies the importance of travel geography   | PSO-1, 2 | R,U             | C                  | L                        | -             |
| 3      | Analyses about formalities of travel  | PSO-1    | An              | M                  | L                        | -             |
| 4      | Evaluate the significance of tourism in the cultural, social and economic milieu of geographic spaces | PSO-1    | E               | M                  | L                        | -             |
| 5      | Understand the existence and location of tourist spots and will be able to identify new tourist spots | PSO-2    | U               | M                  | L                        | p             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|             | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|-------------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| <b>CO 1</b> | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| <b>CO 2</b> | 3     | 3     | -     | -     | 3    | 3    | -    | -    | -    | -    | -    | -    |
| <b>CO 3</b> | 3     | -     | -     | -     | 3    | 2    | -    | -    | -    | -    | -    | -    |
| <b>CO 4</b> | 3     | -     | -     | -     | 3    | -    | -    | 1    | -    | -    | -    | -    |
| <b>CO 5</b> | -     | 3     | -     | -     | 3    | 2    | -    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             | ✓          |            | ✓                         |
| CO 3 | ✓             | ✓          |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             | ✓          |            |                           |





**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK1DSCGGY105</b>   |                  |                   |                    |                  |
| Course Title   | <b>MEDICAL GEOGRAPHY</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>  |                  |                   |                    |                  |
| Semester       | I   |                  |                   |                    |                  |
| Academic Level | 100 - 199   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | Explores the ways in which human-environment interactions impact on human health and disease. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content   | Hrs |
|------------|--|---|-----|
| <b>I</b>   | <b>Introduction</b>                          |   | 8   |
|            | 1  | History and development of Medical/Healthcare Geography.  |     |
|            | 2  | Concept of health, its measurement and data source.   |     |
| <b>II</b>  | <b>Approaches</b>                            |   | 8   |
|            | 3  | Environmental, ecological and social approaches in study of human health.   |     |
| <b>III</b> | <b>Ecology and Etiology of Diseases</b>      |   | 10  |
|            | 4  | Ecology and etiology of diseases; Communicable diseases: Cholera, malaria, tuberculosis, hepatitis, leprosy, AIDS and STDs.   |     |
|            | 5  | Non-communicable diseases : cardiovascular and cancer   |     |
|            | 6  | Diffusion of diseases and their causes. Deficiency disorders and problems of malnutrition and over-nutrition; malnutrition diseases and over nutrition diseases.  |     |
| <b>IV</b>  | <b>Health - Care Infrastructure in India</b> |   | 10  |
|            | 7  | Healthcare infrastructure: spatial organization and pattern in India; . Health financing in India   |     |
|            | 8  | Climate change and human health, Food security, nutrition and hunger index; Urban Health  |     |
| <b>V</b>   | <b>Health - Care Planning in Kerala</b>      |   | 9   |
|            | 9  | Health-care planning in Kerala - Government and NGOs; Health-care Planning and Policies; availability, accessibility and utilization of Health care services; International support - WHO, UNICEF, Red Cross. |     |

**PRACTICALS**

**(30 hours)**

**Exercise1:** Disease spread mapping and analysis using secondary data.

**Exercise2:** Prepare health appraisal report of the nearest local body.

### References:

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- Mc-Glashan, N.D.(1972) : Medical Geography, Techniques and Field Studies, Methuen, London.
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- Akhtar, R.(1982) : The Geography of Health: An Essay and Bibliography, Marwah, New Delhi.
- Shannon, G.W. and Dever, G.E.A.(1973) : Health Care Delivery, Special Perspectives, New York.
- Akhtar Rais (1990), Environmental population and health problems, Ashish Publishers Home, New Delhi.
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- Siddiqui, M.F. (1971), "Concentration of Deficiency Diseases in Uttar Pradesh." The Geographer, Vol. 18 pp 90-98.
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- J. Nasir, E.F. Khanam, "Traffic Noise Pollution in National Capital region : A case study : The Grographer, Vol. 53, No. 1, 2006, pp. 73-79
- K. Chaubey, "Epidemic of HIV/AIDS in India : A Study in Medical Geography." Annal of NAGD, Vol. XXV No.1 , 2005 pp 28-33.
- Aikat, B.K. (1985) Tropical diseases in India, Arnold Meinemann, Delhi, 1st Edn.
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- Egles, J. and Woods, K.J. (1983) The Social Geography of Medicine and Health, Groom Helm London, 1st Edn.

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- <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/medical-geography>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10292032/>

➤ <https://www.improvingphc.org/kerala-india-governance>

**Course Outcomes**

| No.  | Upon completion of the course the graduate will be able to                      | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | To develop a basic understanding of health and development of Medical Geography | U               | PSO-1         |
| CO-2 | To analyse various approaches in human health.                                  | U               | PSO-1         |
| CO-3 | To create awareness about different types of diseases and its impacts           | R, C            | PSO-4         |
| CO-4 | To Evaluate the Health-care Infrastructure in India                             | E               | PSO-1         |
| CO-5 | To Analyse various healthcare planning in India                                 | U               | PSO-1         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: MEDICAL GEOGRAPHY**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|--------|-----------------|--------------------|--------------------------|---------------|
| 1      | To develop a basic understanding of health and development of Medical Geography | PSO-1  | U               | F                  | L                        |               |
| 2      | To analyse various approaches in human health.                                  | PSO-1  | U               | C                  | L                        |               |
| 3      | To create awareness about different types of diseases and its impacts           | PSO-4  | R, C            | M                  | L                        | P             |
| 4      | To Evaluate the Health-care Infrastructure in India                             | PSO-1  | E               | F                  | L                        |               |

|   |   |       |   |   |   |  |
|---|---|-------|---|---|---|--|
| 5 | To Analyse various healthcare planning in India | PSO-1 | U | F | L |  |
|---|---|-------|---|---|---|--|

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PS O4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     |       | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 3 | -     | -     | 1     | -     | -    | -    | -    | 2    | -    | -    | -    | -    |
| CO 4 | 2     | -     |       |       | 2    | -    | -    | -    | -    | -    | -    | -    |
| CO 5 | 2     |       | -     | -     | 2    | -    | -    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment / Discussion / Seminar/Survey
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Quiz | End Semester Examinations |
|------|---------------|------------|------|---------------------------|
| CO 1 | ✓             | ✓          | ✓    | ✓                         |
| CO 2 | ✓             | ✓          | ✓    | ✓                         |
| CO 3 | ✓             | ✓          |      | ✓                         |
| CO 4 | ✓             | ✓          |      | ✓                         |
| CO 5 | ✓             | ✓          |      |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK1MDCGGY100</b>   |                  |                   |                    |                  |
| Course Title   | <b>INTRODUCTION TO GEOPOLITICS</b>  |                  |                   |                    |                  |
| Type of Course | <b>MDC</b>  |                  |                   |                    |                  |
| Semester       | I   |                  |                   |                    |                  |
| Academic Level | 100-199   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 3   | 3 hours          | -                 | -                  | 3                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | Understand the key concepts in contemporary political geography, such as the state, nation, nation-state, and nation-building. They also understand geopolitics and geostrategic views from a global perspective, as well as the current challenges of politics at various scales |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module | Unit  | Content  | Hrs |
|--------|---|--|-----|
| I      | <b>Introduction</b>                                       |  | 9   |
|        | 1   | Introduction: Scope and nature of Political Geography; Recent trends in Political Geography                              |     |
|        | 2   | Concept of nation and state; geopolitics; politics of world resources  |     |
| II     | <b>Geo-strategic views</b>                                |  | 9   |
|        | 3   | Geo-strategic views: Mahan, Mackinder, Spikeman.   |     |
|        | 4   | Geopolitical World Orders; Formation of Frontiers and Boundaries, Border Lands, Buffer States and Land-Locked State.     |     |
| III    | <b>International Relations</b>                            |  | 9   |
|        | 5   | Relevance of Geo Politics in International Relations   |     |
|        | 6   | Political Geography of Ocean: Maritime Boundaries, delimitations: principles and problems                                |     |
|        | 7   | International law of the sea. Mahan's Sea Power concept  |     |
| IV     | <b>Electoral Geography</b>                                |  | 9   |
|        | 8   | Electoral Geography: methods of studying electoral geography, Geographical influence in voting.                          |     |
|        | 9   | Geography of Electoral support and Representation: Constituencies and their evolution.                                   |     |
|        | 10  | Case Studies of Indian Elections   |     |
| V      | <b>Geographical Factors in India's Political Spectrum</b> |  | 9   |
|        | 11  | Geographical Factors in India's Political Spectrum ; Role of terrain, Rivers and sea coasts in shaping political history |     |
|        | 12  | Linguistics conflicts, separatist movements, river water disputes.   |     |
|        | 13  | The International Boundary of India and related issues. India's political alliance.                                      |     |

## Reference

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  - Agnew, J. 2002. Making Political Geography, Arnold, London
  - Agnew, J., Mitchell, K. and Toal, G. eds. 2003. A Companion to Political Geography, Blackwell, Oxford
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  - Prescott, J.R.V. 1972. The Political Geography, Methuen, London
  - Taylor, P. and Flint, C. 2000. Political Geography, Pearson Education, Harlow, Essex
  - Weiner M and J Osgoodfield (eds.), 1975. Electoral Politics in the Indian States, Centre for International Studies, MIT
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- <https://medium.com/india-centre/the-story-of-the-evolution-of-parliamentary-democracy-in-india-b043a5de1479>
- <https://www.csis.org/analysis/indian-elections-and-globalization>
- <https://lotusarise.com/international-boundary-of-india-and-related-issues-upsc/>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to  | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understand the concepts of geopolitics  | U               | PSO-1,2       |
| CO-2 | Understand how the geographical factors contributed for the developments of world major power blocs and shaping the political history.                                      | An              | PSO- 1,2      |
| CO-3 | Evaluate the characteristics territorial bases of the state with respect of its neighbourhood   | E               | PSO 1, 2      |
| CO-4 | Analyse geographical factors determine the election results and the formation of constituencies as well as the major characteristics of politico electoral regions of India | U               | PSO 3         |
| CO-5 | Demonstrate the relevance of geographical peculiarities determining India as a territory (Political unit)   | An              | PSO 4         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: Introduction to Geopolitics**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO   | PO/ PSO   | Cognitive Level | Knowledge Category | Lecture (L) /Tutorial(T) | Practical (P) |
|--------|--|-----------|-----------------|--------------------|--------------------------|---------------|
| CO-1   | Understand the concepts of geopolitics   | PSO -1,2  | U               | C                  | L                        | -             |
| CO-2   | Understand how the geographical factors contributed for the developments of world major power blocs and shaping the political history. | PSO - 1,2 | An              | M                  | L                        | -             |
| CO-3   | Evaluate the characteristics territorial bases of the state with respect of its neighbourhood  | PSO 1, 2  | E               | P                  | L                        | -             |

|      |   |       |    |   |   |   |
|------|---|-------|----|---|---|---|
| CO-4 | Analyse geographical factors determine the election results and the formation of constituencies as well as the major characteristics of politico electoral regions of India | PSO 3 | U  | C | L | - |
| CO-5 | Demonstrate the relevance of geographical peculiarities determining India as a territory (Political unit)   | PSO 4 | An | M | L | - |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 2     | 2     | -     | -     | 2    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 2     | 2     | -     | -     | 2    | -    | -    | -    | -    | -    | -    | -    |
| CO 3 | 2     | 2     | -     | -     | 2    | -    | -    | -    | -    | -    | -    | -    |
| CO 4 | -     | -     | 2     | -     | -    | -    | -    | -    | -    | 2    | -    | -    |
| CO 5 | -     | -     | -     |       | -    | -    | -    | -    | 3    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Project Evaluation | End Semester Examinations |
|------|---------------|------------|--------------------|---------------------------|
| CO 1 | ✓             |            |                    | ✓                         |
| CO 2 | ✓             |            |                    | ✓                         |
| CO 3 | ✓             |            |                    | ✓                         |
| CO 4 |               | ✓          | ✓                  | ✓                         |
| CO 5 |               | ✓          |                    | ✓                         |





**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK1MDCGGY101</b>   |                  |                   |                    |                  |
| Course Title   | <b>INTRODUCTION TO EARTH SCIENCE AND ENVIRONMENT</b>  |                  |                   |                    |                  |
| Type of Course | <b>MDC</b>  |                  |                   |                    |                  |
| Semester       | <b>I</b>  |                  |                   |                    |                  |
| Academic Level | 100-199   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 3   | 3                | -                 | -                  | 3                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | The course will provide an understanding of the basics of earth, the processes that shape landform, major relief features and current Environmental problems faced. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                  | Content  | Hrs |
|------------|---------------------------------------|--|-----|
| <b>I</b>   | <b>Basics of Earth</b>                |  | 9   |
|            | 1                                     | Solar system and Planets-Size and Shape of Earth   |     |
|            | 2                                     | Geographical Locations- Latitude-Longitude and Time Zone-International Date Line   |     |
|            | 3                                     | Seasons and Time   |     |
|            | 4                                     | Structure and Composition of earth   |     |
| <b>II</b>  | <b>Exogenic Process</b>               |  | 9   |
|            | 5                                     | Exogenic process-definition-types  |     |
|            | 6                                     | Weathering-Factors influencing-Types   |     |
|            | 7                                     | Mass wasting-Types   |     |
|            | 8                                     | Brief ideas of role played by running water-wind-glacier-sea waves-underground water   |     |
| <b>III</b> | <b>Endogenetic Process</b>            |  | 9   |
|            | 9                                     | Endogenetic process-Classification-Sudden and diastrophic process  |     |
|            | 10                                    | Earthquakes-definition-focus-epicentre-seismograph-earthquake intensity-magnitude;-earthquake waves-surface waves-body waves; causes of earthquake; effects of earthquake; world distribution of earthquake  |     |
|            | 11                                    | Volcano-definition; parts of volcano; types of volcanic eruption-classification based on mode of eruption-central and fissure-Classification based on periodicity of eruptions-active-dormant and extinct; Volcanic materials-Vapour and gases-Magma and lava- pyroclastic materials-World distribution of volcanoes |     |
| <b>IV</b>  | <b>Major Relief features of earth</b> |  | 9   |
|            | 11                                    | Mountains-forms- types of mountains  |     |
|            | 12                                    | Plateau-definition-classification  |     |
|            | 13                                    | Plain-definition-types of plains   |     |

| Global Environmental Issues |    |  |
|-----------------------------|----|--|
| V                           | 14 | Climatic change-Global warming-Ozone depletion-Causes and effects-mitigation |
|                             | 15 | Pollution-types-air-water and land- causes and effects-mitigation            |

9

## Reference

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- Bloom, A.L. (1991): Geomorphology, 2nd Ed Englewood Cliffs, M.J. Prentice Hall
- Briggs, K. (1985): Physical Geography Process and System, Hodder and Stoughton, London
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- <https://www.nationalgeographic.com/environment/article/ozone-depletion>
- <https://www.timeanddate.com/time/dateline.html#:~:text=The%20International%20Date%20Line%20%28IDL%29%20is%20located%20at,of%20time%20zones%2C%20which%20runs%20>
- <https://www.britannica.com/story/different-types-of-pollution>
- [https://geo.libretexts.org/Bookshelves/Geology/Book%3A An Introduction to Geology \(Johnson Affolter Inkenbrandt and Mosher\)/04%3A Igneous Processes and Volcanoes/](https://geo.libretexts.org/Bookshelves/Geology/Book%3A%20An%20Introduction%20to%20Geology%20(Johnson%20Affolter%20Inkenbrandt%20and%20Mosher)/04%3A%20Igneous%20Processes%20and%20Volcanoes/)

### Course Outcomes

| No   | Upon completion of Population and Cultural Geography the graduate will be able to   | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understand the basic features of solar system and earth and the concept of time and date calculation  | R,U             | PSO 1         |
| CO-2 | Acquire knowledge about different landforms by running water, wind, glacier, sea waves and underground water and develop ability to identify them | R,U             | PSO 1         |
| CO-3 | Develop the concept of endogenic process, volcanism and earthquake  | C               | PSO 1         |
| CO-4 | Acquire knowledge on different types of mountains, plains and plateau and ability to distinguish them   | U               | PSO 1         |
| CO-5 | Recognise the global environmental issues   | An              | PSO 2 & PSO 4 |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: INTRODUCTION TO EARTH SCIENCE AND ENVIRONMENT**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|--------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the basic features of solar system and earth and the concept of time and date calculation  | PSO-1  | R,U             | F,C                | L                        | -             |
| 2      | Acquire knowledge about different landforms by running water, wind, glacier, sea waves and underground water and develop ability to identify them | PSO-1  | R,U             | F, C               | L                        | -             |

|   |   |             |    |   |   |   |
|---|---|-------------|----|---|---|---|
| 3 | Develop the concept of endogenic process, volcanism and earthquake                                    | PSO-1       | C  | P | L | - |
| 4 | Acquire knowledge on different types of mountains, plains and plateau and ability to distinguish them | PSO-1       | U  | C | L | - |
| 5 | Recognise the global environmental issues   | PSO-2,<br>4 | An | M | L | - |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|------|------|-------|-------|-------|------|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | 3    | -     | -     | -     | 3    | -   | -   | -   | -   | -   | -   | -   |
| CO 2 | 3    | -     | -     | -     | 3    | -   | -   | -   | -   | -   | -   | -   |
| CO 3 | 3    | -     | -     | -     | 3    | -   | -   | -   | -   | -   | -   | -   |
| CO 4 | 3    | -     | -     | -     | 3    | -   | -   | -   | -   | -   | -   | -   |
| CO 5 | -    | 3     | -     | 3     | -    | -   | -   | -   | 3   | -   | -   | 3   |

**Assessment Rubrics:**

- Quiz / Assignment/Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion/Quiz | End Semester Examinations |
|------|---------------|------------|-----------------|---------------------------|
| CO 1 | ✓             |            |                 | ✓                         |
| CO 2 | ✓             |            |                 | ✓                         |
| CO 3 | ✓             | ✓          |                 | ✓                         |
| CO 4 | ✓             |            |                 | ✓                         |
| CO 5 |               | ✓          | ✓               | ✓                         |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK2DSCGGY100</b>  |                  |                   |                    |                  |
| Course Title   | <b>CLIMATOLOGY AND OCEANOGRAPHY</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | II   |                  |                   |                    |                  |
| Academic Level | 100-199  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3                | -                 | 2                  | 5                |
| Pre-requisites | UK1DSCGGY100/ UK1DSCGGY101/ UK1DSCGGY102/ UK1DSCGGY103   |                  |                   |                    |                  |
| Course Summary | This course helps to students to understand the basic principles and processes governing the earth's weather and climate. Specifically, we will examine insolation, heat budget, atmospheric circulation, condensation, precipitation, and application level of climatology. Distribution of Oceans, Ocean circulation and Marine resources is also discussed in this course. Practical activities comprise identification of weather signs and symbols and weather map interpretation and illustration of currents of oceans. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                   | Content   | Hrs |
|------------|--|---|-----|
| <b>I</b>   | <b>Introduction to Climatology</b>     |   | 9   |
|            | 1                                      | Climatology : Weather and climate - Insolation – Terrestrial Radiation                        |     |
|            | 2                                      | Earth's Heat Budget : Heating and cooling of the Atmosphere - Albedo                          |     |
|            | 3                                      | Composition and Structure of the Atmosphere   |     |
| <b>II</b>  | <b>Temperature, Pressure and Winds</b> |   | 9   |
|            | 4                                      | Horizontal and Vertical distribution of Temperature- Normal lapse rate- Temperature inversion |     |
|            | 5                                      | Horizontal Distribution of Pressure Belts - Vertical distribution of Pressure                 |     |
|            | 6                                      | Wind Systems : Planetary Winds - Trade Winds, Westerlies, Easterlies                          |     |
|            | 7                                      | Seasonal winds : Monsoons - Jetstreams : Subtropical and Polar                                |     |
|            | 8                                      | Local winds : Chinook, Sirocco, Foehn, Harmattan, Loo, Bora, Mistral                          |     |
| <b>III</b> | <b>Moisture in the Atmosphere</b>      |   | 9   |
|            | 9                                      | Humidity in the Atmosphere : Absolute, Relative and Specific Humidity                         |     |
|            | 10                                     | Evapotranspiration-Condensation forms : Dew, Frost, Fog , Mist, Smog                          |     |
|            | 11                                     | Clouds: Classification of clouds –Low clouds, Medium clouds. High clouds                      |     |
|            | 12                                     | Precipitation: Snow, Hail, Drizzle, Rainfall: Convectonal. Orographic, Cyclonic               |     |
|            | 13                                     | Cyclones: Tropical and Temperate – Recent cyclonic events in India.                           |     |
| <b>IV</b>  | <b>Introduction to Oceanography</b>    |   | 9   |

|   |                         |   |   |
|---|-------------------------|---|---|
|   | 14                      | General bottom relief of the Ocean floor                                    |   |
|   | 15                      | Temperature and Salinity : Horizontal and Vertical Distribution             |   |
|   | 16                      | Oceanic Movements : Capillary waves/ Sea Swells/ Storm Surge/ Tsunami       |   |
|   | 17                      | Tides: Classification based on frequency, spring tide and neap tide.        |   |
|   | 18                      | Currents : Major Currents of Pacific, Atlantic, Indian Ocean, Elnino/LaNina |   |
| V | <b>Marine Resources</b> |   | 9 |
|   | 19                      | Marine Deposits: Terrigenous Deposits and Pelagic Deposits                  |   |
|   | 20                      | Coral Reefs : Fringing reefs/ Barrier reefs/ Atolls/Patch reefs             |   |
|   | 21                      | Threats to Marine Environment: Oil spill-Over fishing-Sea Level Rise        |   |

## PRACTICALS

(30 Hours)

**Exercise 1:** Representation of Meteorological symbols, Construction of Station model

**Exercise 2:** Preparation of Isobars and Isotherm

**Exercise 3:** Weather Map interpretation

**Exercise 4:** Conduct field survey and prepare beach profile

**Exercise 5:** Illustration of currents of Pacific, Atlantic and Indian Ocean

## References

- An Introduction to Climate – Glenn T Trewartha, Tata Mc Graw Hill, New Delhi
- General Climatology – Howard J Critchfield, Phi Learning Pvt Ltd, 1983
- Contemporary Climatology-Robinson P J and Henderson S, Henlow, 1999.
- Atmosphere, Weather and Climate – Barry and Chorley, Routledge, London, 2003
- Physical basis of Geography – Wooldridge and Morgan, Longman Green
- Modern Physical Geography – Arthur N. Strahler and All H. Strahler, Wiley
- Physical Geography – Majid Husain, Rawat Publications, Jaipur, 2003
- Physical Geography – D. S. Lal Sharda Pustak Bhavan, Allahabad.
- Understanding Weather- KREL Karel Hughes and Julian Mays, Routledge, 2004
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- J.J. Bhatt (1978)., Oceanography: Exploring the Planet Ocean., D. Van Nostrand Company, NewYork.
- Savindra Singh (2013)., Oceanography., Pravalika Publications., India.
- D.S. Lal (2023)., Oceanography Sharda Pustak Bhawan., India.
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- Drake, Charles L.; Imbrie, John; Knauss, John A.; Turekian, Karl K.(1978)., Oceanography., Holt, Rinehart, and Winston, New York.
- K. Siddhartha., (2018) Oceanography: A Brief Introduction., Kitab Mahal., India.
- Tom Garrison (2011)., Essentials of Oceanography., Brooks/Cole; International edition.

## Web References

- <https://education.nationalgeographic.org/resource/climatology/>
- <https://nios.ac.in/media/documents/316courseE/ch10.pdf>

- <https://www.britannica.com/science/climate-meteorology/Solar-radiation-and-temperature>
- <https://www.britannica.com/science/climate-meteorology/Atmospheric-pressure-and-wind>
- <https://education.nationalgeographic.org/resource/atmospheric-pressure/>
- <https://www.britannica.com/science/humidity>
- <https://ebooks.inflibnet.ac.in/geop14/chapter/applied-climatology/>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                        | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Differentiate weather and climate   | An              | PSO-1         |
| CO-2 | Identify and categorize temperature distribution, pressure belts and wind systems | R,An            | PSO-1         |
| CO-3 | Differentiate Condensation and Precipitation forms, mechanism of Cyclonic Systems | An              | PSO-1         |
| CO-4 | Illustrate bottom relief of Oceans, Ocean Currents.                               | U,Ap            | PSO-3         |
| CO-5 | Examine the types of marine deposits and threat to marine environment.            | An              | PSO-4         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: CLIMATOLOGY AND OCEANOGRAPHY**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO  | PO/P SO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Differentiate weather and climate   | PSO-1   | An              | F                  | L                        |               |
| 2      | Identify and categorize temperature distribution, pressure belts and wind systems | PSO-1   | R, An           | F                  | L                        | P             |
| 3      | Differentiate Condensation and Precipitation forms, mechanism of Cyclonic Systems | PSO-1   | An              | C                  | L                        |               |

|   |  |       |      |   |   |   |
|---|--|-------|------|---|---|---|
| 4 | Illustrate bottom relief of Oceans, Ocean Currents.                    | PSO-3 | U,Ap | C | L | P |
| 5 | Examine the types of marine deposits and threat to marine environment. | PSO-4 | An   | M | L |   |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | 3    | -    | -    | -    | 3   | -   | -   | 1   | -   | -   | -   | -   |
| CO 2 | 3    | -    | -    | -    | 3   | -   | -   | 1   | -   | -   | -   | -   |
| CO 3 | 3    | -    | -    | -    | 3   | -   | -   | 2   | -   | -   | -   | -   |
| CO 4 | -    | -    | 3    | -    | -   | -   | -   | -   | -   | 3   | -   | -   |
| CO 5 | -    | -    | -    | 3    | -   | -   | -   | -   | 1   | -   | -   | 3   |

**Assessment Rubrics:**

- Quiz / Assignment / Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             | ✓          |            | ✓                         |
| CO 3 | ✓             | ✓          |            | ✓                         |
| CO 4 | ✓             | ✓          |            | ✓                         |
| CO 5 | ✓             | ✓          | ✓          |                           |





**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | GEOGRAPHY  |                  |                   |                    |                  |
| Course Code    | <b>UK2DSCGGY101</b>  |                  |                   |                    |                  |
| Course Title   | <b>CLIMATOLOGY</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | II   |                  |                   |                    |                  |
| Academic Level | 100-199  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3                | -                 | 2                  | 5                |
| Pre-requisites | UK1DSCGGY100/ UK1DSCGGY101/ UK1DSCGGY102/<br>UK1DSCGGY103  |                  |                   |                    |                  |
| Course Summary | This course helps the students to understand the principles and processes governing the earth's weather and climate. Specifically, the learner will be able to explore concepts of insolation, heat budget, atmospheric circulation, condensation, precipitation, and applied climatology. Practical activities comprise identification of weather signs and symbols, statistical representation of weather data and weather map interpretation. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content  | Hrs |
|------------|---|--|-----|
| <b>I</b>   | <b>Introduction to Climatology</b>                                    |  | 5   |
|            | 1   | Climatology: Definition, Nature, and Scope. Weather and Climate                              |     |
|            | 2   | Atmosphere- Structure and Composition  |     |
| <b>II</b>  | <b>Insolation and Temperature</b>                                     |  | 10  |
|            | 3   | Insolation- factors influencing insolation-Solar constant                                    |     |
|            | 4   | Heat Budget-Albedo   |     |
|            | 5   | Heating and cooling of the atmosphere: Terrestrial radiation-Conduction Convection-Radiation |     |
|            | 6   | Horizontal and Vertical Distribution of Temperature-Normal Lapse Rate                        |     |
| <b>III</b> | <b>Atmospheric Pressure and Winds</b>                                 |  | 12  |
|            | 7   | Temperature inversion- Ideal conditions and Significance                                     |     |
|            | 8   | Global Pressure Belts –Location-Formation and Significance                                   |     |
|            | 9   | Factors affecting the vertical distribution of atmospheric pressure                          |     |
|            | 10  | Planetary winds- Trade winds-Westerlies-Polar Easterlies                                     |     |
|            | 11  | Seasonal wind - Monsoon: Southwest and Northeast-El Nino, La Nino                            |     |
|            | 12  | Local winds -Chinook, Sirocco, Foehn, Harmattan, Loo, Bora, Mistral                          |     |
| 13         | Periodic local winds- Land and Sea breeze- Mountain and Valley breeze |  |     |
| <b>IV</b>  | <b>Moisture in the atmosphere</b>                                     |  | 9   |
|            | 14  | Geostrophic winds-Jet streams -Significance  |     |
|            | 15  | Humidity- Absolute-Relative-Specific   |     |
|            | 16  | Evaporation, condensation, and its forms   |     |
|            | 17  | Clouds- Formation – Classification based on altitude   |     |

|   |                            |  |   |
|---|----------------------------|--|---|
|   | 18                         | Precipitation: Forms , Types of rainfall                             |   |
|   | 19                         | Air mass: Source regions-Types based on source region. Fronts: types |   |
|   | 20                         | Cyclones: Tropical and Temperate                                     |   |
| V | <b>Applied Climatology</b> |  | 9 |
|   | 21                         | Climate Change and mitigation  |   |
|   | 22                         | Acclimatization- Urban Climate                                       |   |

### PRACTICALS:

(30 Hours)

**Exercise 1:** Illustration of weather signs and symbols, Station model

**Exercise 2:** Preparation of suitable diagrams using climatic data in Microsoft Excel

**Exercise 3:** Isobar and Isotherm

**Exercise 4:** Weather map interpretation

**Exercise 5:** Conduct field survey for identification and delineation of micro climate

### References:

- An Introduction to Climate – Glenn T Trewartha, Tata Mc Graw Hill, New Delhi
- General Climatology – Howard J Critchfield, Phi Learning Pvt Ltd, 1983
- Contemporary Climatology-Robinson P J and Henderson S, Henlow, 1999.
- Atmosphere, Weather and Climate – Barry and Chorley, Routledge, London, 2003
- Physical basis of Geography – Wooldridge and Morgan, Longman Green
- Modern Physical Geography – Arthur N. Strahler and All H. Strahler, Wiley
- Physical Geography – Majid Husain, Rawat Publications, Jaipur, 2003
- Physical Geography – D. S. Lal Sharda Pustak Bhavan, Allahabad.
- Understanding Weather- KREL Karel Hughes and Julian Mays, Routledge, 2004
- Practical geography- Kullar

### Web References:

- <https://education.nationalgeographic.org/resource/climatology/>
- <https://nios.ac.in/media/documents/316courseE/ch10.pdf>
- <https://www.britannica.com/science/climate-meteorology/Solar-radiation-and-temperature>
- <https://www.britannica.com/science/climate-meteorology/Atmospheric-pressure-and-wind>
- <https://education.nationalgeographic.org/resource/atmospheric-pressure/>
- <https://www.britannica.com/science/humidity>
- <https://ebooks.inflibnet.ac.in/geop14/chapter/applied-climatology/>

### Course Outcomes

| No.  | Upon completion of the course, the graduate will be able to | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understand the nature and scope of climatology              | U               | PSO-1         |
| CO-2 | Understand the variation in the distribution of temperature | An              | PSO-2         |

|      |   |    |         |
|------|---|----|---------|
| CO-3 | Analyze the distribution of pressure systems and winds                        | An | PSO-2   |
| CO-4 | Evaluate how atmospheric moisture works                                       | E  | PSO-2,3 |
| CO-5 | Inspects the association of climate with other environmental and human issues | An | PSO-2,3 |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: CLIMATOLOGY**

**Credits: 4:0:0 (Lecture:Tutorial: Practical)**

| CO No. | CO  | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L) /Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|---------------------------|---------------|
| 1      | Understand the nature and scope of climatology                                | PSO-1   | U               | F                  | L                         | -             |
| 2      | Understand the variation in the distribution of temperature                   | PSO-2   | An              | M                  | L                         | p             |
| 3      | Analyze the distribution of pressure systems and winds                        | PSO-2   | An              | M                  | L                         | p             |
| 4      | Evaluate how atmospheric moisture works                                       | PSO-2,3 | E               | C                  | L                         | -             |
| 5      | Inspects the association of climate with other environmental and human issues | PSO-2,3 | An              | M                  | L                         | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|      | PSO 1 | PSOv 2 | PSOv 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|--------|--------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -      | -      | -     | -    | 1    | -    | -    | -    | -    | -    | -    |
| CO 2 | -     | 2      | -      | -     | 1    | -    | -    | -    | -    | -    | -    | -    |

|      |   |   |   |   |   |   |   |   |   |   |   |   |
|------|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 3 | - | 2 | 2 | - | 1 | - | - | - | - | - | - | - |
| CO 4 | - | 3 | 3 | - | - | - | - | - | - | - | - | - |
| CO 5 | - | 3 | 3 | - | - | - | - | - | 1 | - | - | - |

**Assessment Rubrics:**

- Quiz / Assignment / Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             | ✓          |            | ✓                         |
| CO 3 | ✓             | ✓          |            | ✓                         |
| CO 4 | ✓             | ✓          |            | ✓                         |
| CO 5 | ✓             | ✓          | ✓          |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK2DSCGGY102</b>  |                  |                   |                    |                  |
| Course Title   | <b>GLOBAL CLIMATE AND CLIMATE CHANGE</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | II   |                  |                   |                    |                  |
| Academic Level | 100-199  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3                | -                 | 2                  | 5                |
| Pre-requisites | UK1DSCGGY100/UK1DSCGGY101/UK1DSCGGY102/UK1DSCGGY103  |                  |                   |                    |                  |
| Course Summary | This course explores the fundamentals of global climate systems, focusing on the causes, impacts, and mitigation strategies related to climate change. Through interdisciplinary perspectives, students will gain an understanding of the scientific, social, economic, and policy aspects of climate change at both global and regional levels. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content   | Hrs |
|------------|--|---|-----|
| <b>I</b>   | <b>Introduction to Climate Change</b>            |   | 9   |
|            | 1  | Understanding the Basics of Climate Science   |     |
|            | 2  | Historical Context of Climate Change  |     |
|            | 3  | Key Concepts: Greenhouse Effect, Global Warming, Climate Variability                  |     |
|            | 4  | Climate Models and Predictions  |     |
| <b>II</b>  | <b>Drivers of Climate Change</b>                 |   | 9   |
|            | 5  | Greenhouse Gas Emissions and Sources  |     |
|            | 6  | Deforestation and Land Use Change   |     |
|            | 7  | Impact of Industrialization and Urbanization  |     |
| <b>III</b> | <b>Climate Change and Ecology</b>                |   | 9   |
|            | 8  | Impact of Climate Change on Ecosystems  |     |
|            | 9  | Biodiversity Loss and Species Extinction  |     |
|            | 10   | Ocean Acidification and Coral Reef Degradation  |     |
|            | 11   | Case Studies in Ecological Responses to Climate Change – Polar bear – coral bleaching |     |
| <b>IV</b>  | <b>Climate Change and Society</b>                |   | 9   |
|            | 12   | Socioeconomic Impacts of Climate Change   |     |
|            | 13   | Displacement and Migration  |     |
|            | 14   | Food Security and Agriculture   |     |
|            | 15   | Climate Justice and Equity  |     |
| <b>V</b>   | <b>Climate Change: Mitigation and Adaptation</b> |   | 9   |
|            | 16   | Mitigation Strategies: Renewable Energy, Carbon Capture, and Storage                  |     |
|            | 17   | Adaptation Measures: Infrastructure Resilience, Sustainable Urban Planning            |     |

|  |    |   |  |
|--|----|---|--|
|  | 18 | International Agreements and Policy Responses |  |
|  | 19 | Community Engagement and Climate Action       |  |

## PRACTICALS

(30 Hours)

**Exercise 1:** Illustration of weather signs and symbols

**Exercise 2:** Preparation of climatic diagrams using Microsoft Excel

**Exercise 3:** Representation of temperature and pressure data using Isobar, Isotherm

**Exercise 4:** Station model

**Exercise 5:** Weather map interpretation

**Exercise 6:** Conduct field survey for identification and delineation of micro climate

## References

- Adger, W. Neil, Irene Lorenzoni, and Karen L. O'Brien, eds. *Adapting to Climate Change: Thresholds, Values, Governance*. Cambridge University Press, 2009.
- Archer, David. *The Long Thaw: How Humans Are Changing the Next 100,000 Years of Earth's Climate*. Princeton University Press, 2010.
- Dessler, Andrew, and Edward Parson. *Introduction to Modern Climate Change*. Cambridge University Press, 2014.
- Ghosh, Amitav. *The Great Derangement: Climate Change and the Unthinkable*. University of Chicago Press, 2016.
- Henson, Robert. *The Thinking Person's Guide to Climate Change*. American Meteorological Society, 2014.
- Lovejoy, Thomas E., and Lee Hannah, eds. *Climate Change and Biodiversity*. Yale University Press, 2005.
- Marohasy, Jennifer. *Climate Change: Causes, Effects, and Solutions*. Taylor & Francis, 2018.
- Maslin, Mark. *Climate Change: A Very Short Introduction*. Oxford University Press, 2014.
- Newman, Jonathan A., and Madhur Anand. *Climate Change Biology*. Garland Science, 2019.
- Romm, Joseph. *Climate Change: What Everyone Needs to Know*. Oxford University Press, 2018.
- Sivamohan, M. V. K., and A. Narayanamoorthy, eds. *Climate Change and Agriculture in India: Studies from Selected River Basins*.
- Wing, Scott L., and Cynthia Ware, eds. *Global Climate Change and Terrestrial Invertebrates*. John Wiley & Sons, 2019.
- Williston, Byron. *The Ethics of Climate Change: An Introduction*. Routledge, 2012.

## Web Resources

- [Climate Change - NASA Science](#)
- [What is global warming, facts and information \(nationalgeographic.com\)](#)
- [FAO Climate | Climate change | Food and Agriculture Organization of the United Nations](#)
- [IRENA – International Renewable Energy Agency](#)

### Course Outcomes

| No.  | Upon completion of the course, the graduate will be able to | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understand Climate Change Basics                            | U               | PSO-1         |
| CO-2 | Analyse Drivers of Climate Change                           | An              | PSO-2,3       |
| CO-3 | Evaluate Ecological Impacts                                 | E               | PSO-2,3       |
| CO-4 | Examine Societal Implications                               | U               | PSO-2,4       |
| CO-5 | Identify Mitigation and Adaptation Strategies               | R               | PSO-2,3,4     |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: GLOBAL CLIMATE AND CLIMATE CHANGE**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PSO    | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|-----------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand Climate Change Basics              | PSO-1     | U               | F                  | L                        | -             |
| 2      | Analyse Drivers of Climate Change             | PSO-2,3   | An              | M                  | L                        | P             |
| 3      | Evaluate Ecological Impacts                   | PSO-2,3   | E               | C                  | L                        | -             |
| 4      | Examine Societal Implications                 | PSO-2,4   | U               | F                  | L                        | -             |
| 5      | Identify Mitigation and Adaptation Strategies | PSO-2,3,4 | R               | F                  | L                        | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 1    | 2    | -    | -    | -    | -    | 2    | 1    |
| CO 2 | -     | 3     | 3     | -     | 1    | 3    | -    | -    | -    | -    | 2    | 2    |
| CO 3 | -     | 3     | 2     | -     | 2    | 3    | 3    | -    | -    | -    | 1    | 2    |
| CO 4 | -     | 3     | -     | 3     | 3    | 3    | 2    | -    | 1    | 1    | 2    | 2    |
| CO 5 | -     | -     | 2     | 1     | 3    | 3    | 3    | -    | 1    | -    | 2    | 2    |

**Assessment Rubrics:**

- Quiz / Assignment/Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Quiz | End Semester Examinations |
|------|---------------|------------|------|---------------------------|
| CO 1 | ✓             | ✓          |      | ✓                         |
| CO 2 | ✓             |            | ✓    | ✓                         |
| CO 3 | ✓             | ✓          |      | ✓                         |
| CO 4 | ✓             |            | ✓    | ✓                         |
| CO 5 | ✓             |            |      |                           |





**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK2DSCGGY103</b>  |                  |                   |                    |                  |
| Course Title   | <b>TROPICAL METEOROLOGY</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | II   |                  |                   |                    |                  |
| Academic Level | 100-199  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3                | 2                 | -                  | 5                |
| Pre-requisites | UK1DSCGGY100/ UK1DSCGGY101/ UK1DSCGGY102/<br>UK1DSCGGY103  |                  |                   |                    |                  |
| Course Summary | This course will provide the students with the ability to explore the unique weather phenomena and climatic patterns that characterize tropical regions worldwide. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content   | Hrs      |
|------------|---|---|----------|
| <b>I</b>   | <b>Introduction</b>                           |   | <b>9</b> |
|            | 1   | Meaning and scope of meteorology  |          |
|            | 2   | Historical Development of Meteorology                                   |          |
|            | 3   | Importance of Meteorology in Understanding Weather and Climate          |          |
|            | 4   | Tools and Techniques in Meteorological Studies                          |          |
|            | 5   | Scales of tropical weather systems; meso, synoptic and planetary scales |          |
| <b>II</b>  | <b>Global Pressure Belts And Wind Systems</b> |   | <b>9</b> |
|            | 6   | Atmospheric Pressure and Pressure Belts                                 |          |
|            | 7   | Distribution of air pressure in tropics                                 |          |
|            | 8   | The Coriolis Effect and its Influence on Wind Patterns                  |          |
|            | 9   | Planetary winds – Trade winds – westerlies – polar easterlies           |          |
|            | 10  | Seasonal Variability of Pressure Systems                                |          |
| <b>III</b> | <b>Tropical Cyclones</b>                      |   | <b>9</b> |
|            | 11  | Formation and Development of Tropical Cyclones                          |          |
|            | 12  | Structure and Characteristics of Tropical Cyclones                      |          |
|            | 13  | Life Cycle and Movement of Tropical Cyclones                            |          |
|            | 14  | Impacts of Tropical Cyclones  |          |
|            | 15  | Mitigation and Preparedness for Tropical Cyclones                       |          |
| <b>IV</b>  | <b>Monsoons</b>                               |   | <b>9</b> |
|            | 16  | Definition and Characteristics of Monsoons                              |          |
|            | 17  | Mechanisms Driving Monsoon Circulation                                  |          |
|            | 18  | Summer Monsoons: Onset, Progression, and Characteristics                |          |
|            | 19  | Winter Monsoons: Characteristics and Variability                        |          |
|            | 20  | Impacts and Socioeconomic Significance of Monsoons                      |          |

| V  | Global Warming                                |  | 9 |
|----|---|--|---|
|    | 21  | Basics of Global Warming and Climate Change  |   |
|    | 22  | El Niño-Southern Oscillation (ENSO) Phenomenon: El Niño and La Niña                          |   |
|    | 23  | Mechanisms and Causes of El Niño and La Niña Events  |   |
|    | 24  | Impacts of El Niño and La Niña on Weather Patterns, Ocean Circulation, and Regional Climates |   |
| 25 | Predictability and Forecasting of ENSO Events |  |   |

## PRACTICALS

(30 Hours)

- Exercise 1:** Weather signs and symbols  
**Exercise 2:** Preparation of suitable climatic diagrams using Microsoft Excel  
**Exercise 3:** Isobar, Isotherm  
**Exercise 4:** Station model  
**Exercise 5:** Weather map interpretation  
**Exercise 6:** Conduct field survey for identification and delineation of micro climate

## References

- Ahrens, C. Donald. Meteorology Today: An Introduction to Weather, Climate, and the Environment. Cengage Learning, 2019.
- Chang, C., & Wang, Bin. The Global Monsoon System: Research and Forecast. World Scientific Publishing Co., 2007.
- Emanuel, Kerry. Divine Wind: The History and Science of Hurricanes. Oxford University Press, 2005.
- Holton, James R., & Hakim, Gregory J. An Introduction to Dynamic Meteorology. Academic Press, 2012.
- Hsu, Tim, & Pangchi. Fundamentals of Tropical Climate Dynamics. 2018.
- Krishnamurti, T. N., & Stefanova, Lydia. Tropical Meteorology: An Introduction. 2013.
- Philander, Stephen G. H. El Niño, La Niña, and the Southern Oscillation. Academic Press, 1990.
- Trewartha, Glenn T. An Introduction to Climate. Tata Mc Graw Hill, New Delhi.

## Web references:

- <https://wwf.org.au/what-we-do/climate/impacts-of-global-warming/>
- <https://www.un.org/en/chronicle/article/health-effects-global-warming-developing-countries-are-most-vulnerable>
- <https://www.nrdc.org/stories/what-are-effects-climate-change#weather>

## Course Outcomes

| No.  | Upon completion of the course, the graduate will be able to       | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understand the fundamental concepts and principles of meteorology | U/R             | PSO-1         |
| CO-2 | Explain the dynamics of global wind systems,                      | U/An            | PSO-1,2       |

|      |   |    |           |
|------|---|----|-----------|
|      | including the Coriolis effect and planetary winds.  |    |           |
| CO-3 | Analyze the structure, behavior, and impacts of tropical cyclones   | An | PSO-2,3,4 |
| CO-4 | Evaluate the seasonal variability of monsoons and their impacts on regional climates.   | E  | PSO-2,3   |
| CO-5 | Analyse and explain the concepts of global warming and the dynamics, impacts, and predictability of El Niño and La Niña events. | An | PSO-2,3   |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: TROPICAL METEOROLOGY**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PSO    | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|-----------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the fundamental concepts and principles of meteorology   | PSO-1     | U/R             | F                  | L                        | P             |
| 2      | To explain the dynamics of global wind systems, including the Coriolis effect and planetary winds.                              | PSO-1,2   | U/An            | F/M                | L                        | -             |
| 3      | Analyze the structure, behaviour, and impacts of tropical cyclones  | PSO-2,3,4 | An              | M                  | L                        | -             |
| 4      | Evaluate the seasonal variability of monsoons and their impacts on regional climates.   | PSO-2,3   | E               | C                  | L                        | -             |
| 5      | Analyse and explain the concepts of global warming and the dynamics, impacts, and predictability of El Niño and La Niña events. | PSO-1,2,3 | An              | M                  | L                        | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

### Mapping of COs with PSOs and POs:

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 1    | -    | 2    | -    | -    | -    | 2    | -    |
| CO 2 | 1     | 2     |       | -     | 1    | -    | 2    | -    | -    | -    | -    | -    |
| CO 3 | -     | 3     | 2     | 3     | 2    | 2    | 1    | -    | -    | -    | -    | -    |
| CO 4 | -     | 2     | 3     | -     | 2    | 2    | 2    | -    | 1    | -    | -    | -    |
| CO 5 | 2     | 3     | 2     | -     | 2    | 1    | 3    | -    | -    | -    | -    | -    |

### Assessment Rubrics:

- Quiz / Assignment/Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

### Mapping of COs to Assessment Rubrics:

|      | Internal Exam | Assignment | Seminar | End Semester Examinations |
|------|---------------|------------|---------|---------------------------|
| CO 1 | ✓             |            |         | ✓                         |
| CO 2 | ✓             | ✓          |         | ✓                         |
| CO 3 | ✓             |            |         | ✓                         |
| CO 4 | ✓             | ✓          |         | ✓                         |
| CO 5 | ✓             |            | ✓       |                           |



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|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK2DSCGGY104</b>  |                  |                   |                    |                  |
| Course Title   | <b>BIOGEOGRAPHY</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | <b>II</b>  |                  |                   |                    |                  |
| Academic Level | 100-199  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites | UK1DSCGGY100/UK1DSCGGY101/UK1DSCGGY102/<br>UK1DSCGGY103  |                  |                   |                    |                  |
| Course Summary | This course provides an introduction to biogeography, the study of distributions of organisms. It gives the perspectives of origin and distribution of flora and fauna over the earth. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content   | Hrs |
|------------|--|---|-----|
| <b>I</b>   | <b>Introduction</b>                          |   | 9   |
|            | 1  | Definition-Scope and Significance of Bio-geography  |     |
|            | 2  | Basic Ecological principles: Bio-energy cycle in terrestrial ecosystem; trophic levels and food web.                                |     |
|            | 3  | Concepts of Biome, Eco-tone and Community   |     |
| <b>II</b>  | <b>Origin and Distribution of Species</b>    |   | 9   |
|            | 4  | Origin of Fauna and Flora – Plant and animal evolution through Geological times   |     |
|            | 5  | Distribution of plant life on Earth and its relation to soil types, climate and human practices                                     |     |
|            | 6  | Geographical distribution of animal life on the earth and its relation to vegetation types, climate and human activities.           |     |
| <b>III</b> | <b>Major Terrestrial Biomes of the World</b> |   | 9   |
|            | 7  | Tropical Rain Forests -Tropical Grasslands- Deserts   |     |
|            | 8  | Temperate Grasslands-Taiga-Tundra   |     |
| <b>IV</b>  | <b>Major Aquatic Biomes</b>                  |   | 9   |
|            | 9  | Freshwater biomes.  |     |
|            | 10   | Marine biomes   |     |
| <b>V</b>   | <b>Biodiversity Conservation</b>             |   | 9   |
|            | 11   | Problems of Extinction of Plant and Animal Life – Habitat Degradation and their Conservation Practices (Special Reference to India) |     |
|            | 12   | Process of Desertification: Its Consequences and its Management   |     |

## **PRACTICAL**

**(30 hours)**

**Exercise 1:** Mapping and illustrations of biomes of the world.

**Exercise 2:** Visit to wild life sanctuary and prepare a field report.

### **References**

- Cox C D and Moore P D, Biogeography: An Ecological and Evolutionary Approach 5th edn., Blackwell, 1993
- Huggett R J, Fundamentals of Biogeography, Routledge, 2004
- Llies J, Introduction to Zoogeography, McMillan, London, 1974.
- Khoshoo T N and Sharma M (ed.), Indian Geo-sphere-Biosphere Har-Anand Publication, Delhi, 1991.
- Lapedes D N (ed.), Encyclopedia of Environmental Science, McGraw Hill, 1974.
- Mathur H S, Essentials of Biogeography, Anuj Printers, Jaipur, 1998 Pears N., Basis Biogeography 2nd edition, Longman, London, 1985.
- Simmon I G, Biogeography, Natural and Cultural, Longman, London, 1974.
- Tivy J, Biogeography: A study of Plants in Ecosphere, Oliver and Boyd, 1992.
- Ian N Healey, C. Barry Cox, Peter D. Moore, Biogeography: An Ecological and Evolutionary approach, Blackwell, Oxford, 1972.
- Hussain M, Biogeography, Anmol Publications, New Delhi, 1994.
- Robinson H, Biogeography, ELBS & MacDonald and Evans, London, 1972.

### **Web References**

- <https://onlinelibrary.wiley.com>
- <https://www.britannica.com>
- <https://www.nationalgeographic.org>
- <https://earthobservatory.nasa.gov/biome>
- [https://onlinecourses.swayam2.ac.in/cec20\\_hs31/preview](https://onlinecourses.swayam2.ac.in/cec20_hs31/preview)

### Course Outcomes

| No. | Upon completion of the course the graduate will be able to   | Cognitive Level | PSO addressed  |
|-----|--|-----------------|----------------|
| CO1 | Understands the basics of Bio-Geography  | U               | PSO-1          |
| CO2 | Understands the evolution of life on earth and identifies the factors responsible for the distribution of flora and fauna on earth | U               | PSO-1<br>PSO-2 |
| CO3 | Discuss the characteristic features of terrestrial biomes of earth   | Ap              | PSO-1,4        |
| CO4 | Discuss the characteristic features of aquatic of earth  | Ap              | PSO-1,4        |
| CO5 | Analyse the causes of habitat degradation  | An              | PSO-2,5        |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: BIOGEOGRAPHY**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO   | PO/PSO         | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|----------------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understands the basics of Bio-Geography  | PSO-1          | U               | F                  | L                        |               |
| 2      | Understands the evolution of life on earth and identifies the factors responsible for the distribution of flora and fauna on earth | PSO-1<br>PSO-2 | U               | F                  | L                        |               |
| 3      | Discuss the characteristic features of terrestrial biomes of earth   | PSO-1,4        | Ap              | C                  | L                        | P             |
| 4      | Discuss the characteristic features of aquatic of earth  | PSO-1,4        | Ap              | C                  | L                        | P             |
| 5      | Analyse the causes of habitat degradation  | PSO-2,4        | An              | M                  | L                        |               |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PS<br>O1 | PSO<br>2 | PSO<br>3 | PSO<br>4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | 3        | -        | -        | -        | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 2 | 3        | 3        | -        | -        | 3   | 2   | -   | -   | -   | -   | -   | -   |
| CO 3 | 3        | -        | -        | 3        | 3   | -   | -   | 3   | 2   | -   | -   | 1   |
| CO 4 | 3        | -        | -        | 3        | 3   | -   | -   | 3   | 2   | -   | -   | 1   |
| CO 5 | 3        | -        | -        | 3        | 3   | -   | -   | -   | -   | -   | -   | 3   |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion/Quiz | End Semester Examinations |
|------|---------------|------------|-----------------|---------------------------|
| CO 1 | ✓             |            |                 | ✓                         |
| CO 2 | ✓             |            |                 | ✓                         |
| CO 3 | ✓             |            | ✓               | ✓                         |
| CO 4 | ✓             |            | ✓               | ✓                         |
| CO 5 | ✓             | ✓          |                 |                           |





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|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK2DSCGGY105</b>  |                  |                   |                    |                  |
| Course Title   | <b>FUNDAMENTALS OF ECONOMIC GEOGRAPHY</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | <b>II</b>  |                  |                   |                    |                  |
| Academic Level | 100-199  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites | UK1DSCGGY100/UK1DSCGGY101/UK1DSCGGY102<br>UK1DSCGGY103   |                  |                   |                    |                  |
| Course Summary | The course will introduce the concepts and approaches in Economic Geography. It focuses on agriculture, industry and service sectors of economy. |                  |                   |                    |                  |

### Detailed Syllabus:

| Module     | Unit  | Content  | Hrs |
|------------|---|--|-----|
| <b>I</b>   | <b>Basic concepts</b>                           |  | 5   |
|            | 1   | Meaning ,nature and scope of Economic Geography  |     |
|            | 2   | Approaches to study Economic Geography: Regional, Systematic, and Sectoral approaches.   |     |
|            | 3   | Classification of Economic activities  |     |
| <b>II</b>  | <b>Resources</b>                                |  | 7   |
|            | 4   | Concept and classification of resources  |     |
|            | 5   | Distribution and production of mineral resources:Iron, Mica & Gold   |     |
|            | 6   | Distribution and production of energy resources :Wind energy and Coal  |     |
| <b>III</b> | <b>Primary And Secondary Sectors of Economy</b> |  | 12  |
|            | 8   | Factors affecting agriculture activities   |     |
|            | 9   | Types of agriculture: shifting, sedentary, and commercial agriculture.   |     |
|            | 10  | World distribution of major crops : Rice ,Wheat, Sugarcane, and Tea  |     |
|            | 11  | Factors influencing location of industry   |     |
|            | 12  | Types of industries: Cottage, Small, Medium, Large scale industries.   |     |
|            | 13  | Distribution of major industries: Iron and Steel, and Cotton textiles.   |     |
| <b>IV</b>  | <b>Tertiary Sector of Economy</b>               |  | 12  |
|            | 14  | Transport: Modes of transport, their relative advantage and disadvantages, Transcontinental railways-Trans-Siberian railway, Canadian Pacific railway, Trans Australian railway, Major canals-The Suez and Panama canal. |     |
|            | 15  | International trade: Direction of trade, Types of international trade: Bilateral trade, and Multilateral trade, Balance of trade, Favourable and unfavourable balance of trade, Balance of payment.                      |     |

|   |             |                                      |   |
|---|-------------|--------------------------------------|---|
| V | Trade Blocs |                                      | 9 |
|   | 16          | Trade blocs : EU, ASEAN, BRICS, OPEC |   |

## PRACTICALS

(30 Hours)

**Exercise 1:** Drawing divided rectangle, Proportional circles, Star diagram, Bloc diagram, Ergo graph using economic data.

**Exercise 2:** Preparation of flow-line maps of commodity and vehicles

## References

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- [https://epgp.inflibnet.ac.in/epgpdata/uploads/epgp\\_content/S000017GE/P001784/M025354/ET/1512625217HUMANISTICGEOGRAPHY.pdf](https://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S000017GE/P001784/M025354/ET/1512625217HUMANISTICGEOGRAPHY.pdf)
- <https://www.kharagpurcollege.ac.in/studyMaterial/2629Natural-Resources-5th-Semester.pdf>
- <https://ncert.nic.in/textbook/pdf/jess202.pdf>
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### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to   | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the nature, scope and different approaches of Economic Geography.   | U               | PSO-1         |
| CO-2 | Acquire knowledge about the importance of resources and its conservation.  | R, U            | PSO-1,4       |
| CO-3 | Analyses the factors affecting agriculture and industry.   | An              | PSO-2         |
| CO-4 | Evaluate world trade through critical appreciation of direction of trade and understand the advantages and disadvantages of different transport. | E,U             | PSO-1         |
| CO-5 | Gain knowledge about different Trade blocs   | R, U            | PSO-1         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: FUNDAMENTALS OF ECONOMIC GEOGRAPHY**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO   | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the nature, scope and different approaches of Economic Geography.   | PSO-1   | U               | F,C                | L                        |               |
| 2      | Acquire knowledge about the importance of resources and its conservation.  | PSO-1,4 | R, U            | F,M                | L                        | P             |
| 3      | Analyses the factors affecting agriculture and industry.   | PSO-2   | An              | M                  | L                        |               |
| 4      | Evaluate world trade through critical appreciation of direction of trade and understand the advantages and disadvantages of different transport. | PSO-1   | E,U             | C,M                | L                        | P             |
| 5      | Gain knowledge about different Trade blocs   | PSO-1   | R, U            | C,M                | L                        |               |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and PO s :**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | -     | -     | 3     | 3    | -    | -    | -    | -    | -    | -    | 3    |
| CO 3 | -     | 3     | -     | -     | -    | 3    | -    | -    | -    | -    | -    | -    |
| CO 4 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 5 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             | ✓          |            | ✓                         |
| CO 3 | ✓             | ✓          |            | ✓                         |
| CO 4 | ✓             | ✓          |            | ✓                         |
| CO 5 | ✓             | ✓          | ✓          |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK2DSCGGY106</b>  |                  |                   |                    |                  |
| Course Title   | <b>POPULATION GEOGRAPHY</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | II   |                  |                   |                    |                  |
| Academic Level | 100-199  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2                  | 5                |
| Pre-requisites | UK1DSCGGY100/UK1DSCGGY101/UK1DSCGGY102/<br>UK1DSCGGY103  |                  |                   |                    |                  |
| Course Summary | The course focuses on the basic concepts of population, population theories, spatial distribution and characteristics of population in India and Kerala, and major problems related to population. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content  | Hrs |
|------------|---|--|-----|
| <b>I</b>   | <b>Nature and Scope</b>   |  | 7   |
|            | 1   | Nature and Scope of Population Geography   |     |
|            | 2   | Origin and Development of Population Studies   |     |
|            | 3   | Relation of Population Geography with other subjects of social sciences.   |     |
|            | 4   | Approaches to the study of Population Geography  |     |
| 5          | Sources of Population Data - Census of India, Vital Registration System, National Sample Survey, Sample Registration Survey, National Family Health Survey, District Level Household Survey |  |     |
| <b>II</b>  | <b>Population characteristics and Theories</b>  |  | 10  |
|            | 6   | Population Size, Distribution and Growth – Determinants and world patterns   |     |
|            | 7   | Population composition in terms of age, sex and literacy.<br>Population Dynamics: Fertility, Mortality and Migration – Measures and significance |     |
|            | 8   | Human Development Index and its Components.  |     |
| 9          | Theories of Population Growth – Malthusian Theory and Demographic Transition Theory.  |  |     |
| <b>III</b> | <b>Indian Population</b>  |  | 10  |
|            | 10  | Population Size, Distribution and Growth of population in India – Four growth phases in India  |     |
|            | 11  | Characteristics of Indian Population - Sex-ratio , Age structure, Literacy rate  |     |
|            | 12  | Population problems and planning   |     |
| 13         | Dynamics of Population Pyramids and Women Empowerment and Current Population policy of India  |  |     |

|    |                            |   |   |
|----|----------------------------|---|---|
| IV | <b>Kerala Population</b>   |   | 9 |
|    | 14                         | Population Size, Distribution and Growth of population in Kerala  |   |
|    | 15                         | Characteristics of Population – Social development and emigration – Achievements in health and education sector |   |
|    | 16                         | Gender park – aim and initiatives   |   |
| V  | <b>Population Problems</b> |   | 9 |
|    | 17                         | Contemporary Issues - Ageing of Population, Demographic Dividends- Causes, Opportunities and challenges.        |   |
|    | 18                         | Global Refugee Crisis   |   |

## PRACTICALS

**(30 Hours)**

**Exercise 1:** Conduct a socio-economic survey in the nearest local body and represent the data with suitable diagrams

## Reference

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- <https://www.census2011.co.in/census/state/kerala.html>
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### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                 | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the basic concepts and approaches of population geography.      | U               | PSO-1         |
| CO-2 | Understand the population theories as well as demographic characteristics. | R, U            | PSO-1,2       |
| CO-3 | Analyse Indian population and its characteristics                          | An              | PSO-1,2       |
| CO-4 | Analyse Kerala population and its characteristics                          | An              | PSO-1,2       |
| CO-5 | Evaluate the major population related problems                             | E               | PSO-1,2       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: POPULATION GEOGRAPHY**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO   | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the basic concepts and approaches of population geography.      | PSO-1   | U               | F,C                | L                        | -             |
| 2      | Understand the population theories as well as demographic characteristics. | PSO-1,2 | R, U            | F,M                | L                        | -             |
| 3      | Analyse Indian population and its characteristics                          | PSO-1,2 | An              | F,M                | L                        | P             |
| 4      | Analyse Kerala population and its characteristics                          | PSO-1,2 | An              | F,M                | L                        | P             |

|   |  |         |   |   |   |   |
|---|--|---------|---|---|---|---|
| 5 | Evaluate the major population related problems | PSO-1,2 | E | M | L | - |
|---|--|---------|---|---|---|---|

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 2 | 2    | 2    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 3 | 3    | 2-   | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 4 | 3    | 2    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 5 | 3    | 2    | -    | -    | 2   | 2   | -   | -   | -   | -   | -   | -   |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             |            |            |                           |





**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK2MDCGGY100</b>   |                  |                   |                    |                  |
| Course Title   | <b>INTRODUCTION TO CLIMATE CHANGE AND MITIGATION</b>  |                  |                   |                    |                  |
| Type of Course | <b>MDC</b>  |                  |                   |                    |                  |
| Semester       | II  |                  |                   |                    |                  |
| Academic Level | 100 - 199   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 3   | 3 hours          | -                 | -                  | 3                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | The course covers the fundamentals of Climate, the causes and impact of climate change and strategies for mitigating its effects. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Introduction to Climate Change</b>                                 |   | 10  |
|            | 1   | Weather and Climate- Components of Climate System   |     |
|            | 2   | Paleoclimate : Evolution of Atmosphere-Climate forcing  |     |
|            | 3   | Earth's Atmosphere : Structure and Composition  |     |
|            | 4   | Global Heat Budget-Pressure Belts-Planetary winds-Monsoons  |     |
| <b>II</b>  | <b>Climate Change : Nature and Vulnerability</b>                      |   | 10  |
|            | 5   | Climate Change : Meaning and Definition   |     |
|            | 6   | Drivers of Climate Change: Human interventions leading to climate change-enhanced Greenhouse Effect-Global warming  |     |
|            | 7   | Current state of Global climate: -changes in climate extremes-Long term and short term changes- Regional patterns of climate change-Drivers of Regional climate variability and change-Monsoonal response to climate change |     |
| <b>III</b> | <b>Climate Change Impacts on Ecology and Society</b>                  |   | 8   |
|            | 8   | Consequences of Climate change on Ecology : Sea Level Rise-Impacts on Terrestrial Ecosystems-Glacier melting-Wetland Degradation-Drought and floods-Loss of Biodiversity-Impacts on Marine Environment                      |     |
|            | 9   | Socio-economic impacts of climate change : Effects on Political and Human Security, Physical and Mental Health-Indigenous people-Gender-Climate change refugees   |     |
| <b>IV</b>  | <b>Climate Change : Mitigation and Sustainability</b>                 |   | 8   |
|            | 10  | Mitigation, Response, and Resilience to Climate Change : Strategies for Equitable Mitigation and Adaptation   |     |
|            | 11  | Climate change and Environmental sustainability: Ecological foot print - Sustainable Development strategies Climate change mitigation   |     |
|            | 12  | International response to Climate Change : Role of UNFCC and IPCC- Environmental and Climate Change Conventions   |     |
| <b>V</b>   | <b>Climate Modelling and Techniques for Climate Change Assessment</b> |   | 9   |

|  |    |  |  |
|--|----|--|--|
|  | 13 | Basic Types of Global climate models : Energy Balance Models- Radiative-Convective Model- Dimensionally Constrained models- Global Circulation Models- Earth System Models |  |
|  | 14 | Remote sensing technologies for monitoring climate change: Significance and applications   |  |

## References

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- General Climatology – Howard J Critchfield, Phi Learning Pvt Ltd, 1983
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- Henson, Robert. The Thinking Person's Guide to Climate Change. American Meteorological Society, 2014.

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- <https://www.un.org/en/global-issues/climate-change>
- <https://scied.ucar.edu/learning-zone/climate-change-impacts/ecology>
- <https://www.un.org/en/climatechange/what-is-climate-change>

## Course Outcomes

| No.  | Upon completion of the course the graduate will be able to  | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Describe the components, drivers, and interactions of climate   | U               | PSO-1         |
| CO-2 | Analyse causes and effects of climate change  | An              | PSO-1,2       |
| CO-3 | Explain the relationship between human activities and climate change, with emphasis on ecosystems and conservation. | E               | PSO-1,2       |
| CO-4 | Identify potential responses and solutions to climate change challenges, and assess their feasibility and           | E,An            | PSO-3         |

|      |  |    |       |
|------|--|----|-------|
|      | potential effectiveness  |    |       |
| CO-5 | Apply appropriate climate modelling and techniques for climate change assessment | Ap | PSO-3 |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: INTRODUCTION TO CLIMATE CHANGE AND MITIGATION**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PS O | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| CO-1   | Describe the components, drivers, and interactions of climate   | PSO-1   | U               | F                  | L                        | -             |
| CO-2   | Analyse causes and effects of climate change  | PSO-1,2 | An              | F,M                | L                        | -             |
| CO-3   | Explain the relationship between human activities and climate change, with emphasis on ecosystems and conservation.               | PSO-1,2 | E               | C,M                | L                        | -             |
| CO-4   | Identify potential responses and solutions to climate change challenges, and assess their feasibility and potential effectiveness | PSO-3   | E,An            | M                  | L                        | -             |
| CO-5   | Apply appropriate climate modelling and techniques for climate change assessment  | PSO-3   | Ap              | P,M                | L                        | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 2     | 1     | -     | -     | 2    | -    | -    | -    | -    | -    | -    | -    |
| CO 3 | 2     | 3     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 4 | -     | -     | 2     | -     | 2    | 2    | -    | -    | -    | -    | -    | -    |
| CO 5 | -     | -     | 2     | -     | 2    | -    | 1    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             | ✓          |            |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK2MDCGGY101</b>  |                  |                   |                    |                  |
| Course Title   | <b>INTRODUCTION TO DISASTER MANAGEMENT</b>   |                  |                   |                    |                  |
| Type of Course | <b>MDC</b>   |                  |                   |                    |                  |
| Semester       | <b>II</b>  |                  |                   |                    |                  |
| Academic Level | 100-199  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 3  | 3 hours          | -                 | -                  | 3                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | The course will help in acquiring a comprehensive understanding of disasters. Students will acquire knowledge about agencies and organizations dealing with disaster management. The awareness of past disasters and the methods adopted can help in preparing better management strategies for a sustainable society. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                       | Content   | Hrs |
|------------|--|---|-----|
| <b>I</b>   | <b>Introduction to Disasters</b>           |   | 10  |
|            | 1  | Concepts and definitions -Hazard, Vulnerability, Risk, Disaster   |     |
|            | 2  | Classification of disaster - Natural - Geological, Meteorological, Hydrological, Climatological, Biological ; Man-made - Technological – Transport accidents, structure failures, explosions, fires<br>Industrial – Chemical spills, radiation, poisoning, gas leaks - Warfare – War, International conflicts |     |
|            | 3  | Global trends in disasters-urban disasters, pandemics, complex emergencies, climate change  |     |
|            | 4  | Impacts -social, economic, political, environmental, health, psychosocial   |     |
| <b>II</b>  | <b>Disaster Preparedness and Awareness</b> |   | 8   |
|            | 5  | Disaster Management Cycle: mitigation, preparedness, response, recovery   |     |
|            | 6  | Institutional arrangement for Disaster Management   |     |
|            | 7  | Community based Disaster Management - preparedness and awareness  |     |
| <b>III</b> | <b>Disaster Response</b>                   |   | 8   |
|            | 8  | Stakeholders-Roles and responsibilities of different stakeholders-Community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), State and Centre, Task forces and Emergency response teams.  |     |
|            | 9  | Warning Systems and allied Disaster Management bodies- Media, Fire Services, Para-military, Armed forces. Health Department, Communication, Insurance, Civil Society, International NGOs,   |     |

|           |   |  |           |
|-----------|---|--|-----------|
|           |   | National and Local NGOs, Volunteers and Youth groups.  |           |
| <b>IV</b> | <b>Major Disasters – Kerala</b>             |  | <b>10</b> |
|           | 10  | Kerala Disaster Management Experience- Landslides, Coastal Floods, Sabarimala Stampede       |           |
|           | 11  | NIPAH (2018), Kerala Floods (2018), COVID (2019)   |           |
| <b>V</b>  | <b>Disaster and Sustainable Development</b> |  | <b>9</b>  |
|           | 12  | Sustainable Development - Definition and Meaning - Hyogo and Sendai Frameworks and Disasters |           |
|           | 13  | Relationship between sustainable development and disaster risk reduction                     |           |

## References

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- Odum E P (1971) Fundamentals of Ecology, W B Saunders, Philadelphia.
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### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to  | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understand the basic concept of disasters, its types, and characteristics   | U               | PSO-1,2       |
| CO-2 | Analyse and evaluate the policy and administrative processes involved in Disaster Management.                             | U, An           | PSO-1         |
| CO-3 | Understand the role of different agencies in disaster management  | U, R            | PSO-1         |
| CO-4 | Understand how government responded to disasters and appraise the disaster management capabilities of the state of Kerala | U, E            | PSO-1,3       |
| CO-5 | Recognize the role of sustainable development in disaster risk reduction and management                                   | U, Ap           | PSO-1,2       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: INTRODUCTION TO DISASTER MANAGEMENT**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the basic concept of disasters, its types, and characteristics   | PSO-1,2 | U               | F                  | L                        | -             |
| 2      | Analyse and evaluate the policy and administrative processes involved in Disaster Management.                             | PSO-1   | U,An            | F                  | L                        | -             |
| 3      | Understand the role of different agencies in disaster management  | PSO-1   | U, R            | P                  | L                        | -             |
| 4      | Understand how government responded to disasters and appraise the disaster management capabilities of the state of Kerala | PSO-1,3 | U, E            | F                  | L                        | -             |

|   |   |         |       |   |   |   |
|---|---|---------|-------|---|---|---|
| 5 | Recognize the role of sustainable development in disaster risk reduction and management | PSO-1,2 | U, Ap | M | L | - |
|---|---|---------|-------|---|---|---|

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | 2     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 3 | 3     | -     | -     | -     | -    | 3    | -    | -    | -    | -    | -    | -    |
| CO 4 | 2     | -     | 2     | -     | -    | 3    | 3    | -    | -    | -    | -    | -    |
| CO 5 | 3     | 2     | -     | -     | -    | -    | 3    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion/Quiz | End Semester Examinations |
|------|---------------|------------|-----------------|---------------------------|
| CO 1 | ✓             |            |                 | ✓                         |
| CO 2 | ✓             |            |                 | ✓                         |
| CO 3 | ✓             | ✓          |                 | ✓                         |
| CO 4 |               | ✓          | ✓               | ✓                         |
| CO 5 | ✓             |            |                 |                           |





**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK3DSCGGY200</b>  |                  |                   |                    |                  |
| Course Title   | <b>ENVIRONMENTAL GEOGRAPHY</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | III  |                  |                   |                    |                  |
| Academic Level | 200-299  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites | UK2DSCGGY100/UK2DSCGGY101/UK2DSCGGY102/UK2DSCGGY103/UK2DSCGGY104/UK2DSCGGY105/UK2DSCGGY106   |                  |                   |                    |                  |
| Course Summary | This paper highlights the importance of environment on human life. It constitutes different environmental approaches, ecosystem, bio-geo chemical cycles, bio-diversity conservation, environmental issues and major environmental movements in India. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Introduction</b>                                 |   | 6   |
|            | 1   | Introduction to Environment- Meaning and Concept.   |     |
|            | 2   | Nature and scope of Environmental Geography.  |     |
|            | 3   | Environmental Approaches: Environmental Deterministic Approach –Possibilistic Approach - Ecological Approach- Economic deterministic Approach-Geographical Approach.              |     |
| <b>II</b>  | <b>Ecosystem and Man - Environment Relationship</b> |   | 10  |
|            | 4   | Definition and concept - Structure -Biotic and abiotic factors- function - Trophic level, Food chain, Food Web, Energy Flow.  |     |
|            | 5   | Major types of ecosystem: Equatorial and River ecosystems.  |     |
|            | 6   | Bio-Geochemical Cycles-Nitrogen cycle-Carbon cycle  |     |
|            | 7   | Human - Environment Relationship: Human life in the mountain region- desert region- coastal region.   |     |
| <b>III</b> | <b>Biodiversity</b>                                 |   | 10  |
|            | 8   | Definitions and Types of Biodiversity -Genetic Diversity - Species Diversity - Ecosystem Diversity  |     |
|            | 9   | Conservation of Biodiversity: In –situ and Ex-situ conservation of biodiversity   |     |
| <b>IV</b>  | <b>Environmental Issues And Laws</b>                |   | 10  |
|            | 10  | Major Global Environmental Issues: Causes and effects of - Climate change -Ozone depletion - Biodiversity depletion - Unseasonal rainfall- Solid waste pollution - Air pollution. |     |
|            | 11  | Environment Impact Assessment (EIA)   |     |
|            | 12  | Environment Legislation: The Stockholm conference-The Rio-de-Janeiro conference-The Kyoto Conference.   |     |

| V | Major Environmental Movements In India |   | 9 |
|---|--|---|---|
|   | 13                                     | Environmental Management Initiatives in India: Environmental Protection Act, 1982- Environmental Policy of India (2006) |   |
|   | 14                                     | Major Environmental Movements in India: Chipko Movement-Narmada Bachao Andolan  |   |

## PRACTICALS

(30 hours)

**Exercise 1:** Constructions of Map Scale (metric system)

Conversion of scales: Statement scale to RF, RF to statement scale

Construction of Graphic scale: Plain scale, Comparative scale and Time scale

**Exercise 2:** Visit to the environmentally degraded area and investigate causes of degradation. Prepare a report based on field survey/Estimating carbon footprint in any local area site.

## References

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- <https://ebooks.inflibnet.ac.in/geop06/chapter/determinism-in-geography/>
- <https://www.ugc.gov.in/oldpdf/modelcurriculum/Chapter4.pdf>
- <https://www.cbd.int/impact/whatis.shtml>
- <https://www.cseindia.org/understanding-eia-383>

- <https://www.britannica.com/explore/savingearth/chipko-movement>
- <https://www.fao.org/3/R0465E/r0465e03.html>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                              | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Students familiarize with fundamentals concepts of Environmental Geography              | R,U             | PSO-1         |
| CO-2 | Understands the dynamics of man–environment relationship in various region of the world | R,U, An         | PSO-1,2       |
| CO-3 | Students will learn about the types of biodiversity and the need for its conservation.  | U, An           | PSO-1,4       |
| CO-4 | Analyses different environmental policies.  | An, E           | PSO-1         |
| CO-5 | Create environmental awareness amongst the students                                     | U,C             | PSO-2,3       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: ENVIRONMENTAL GEOGRAPHY**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO  | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/ Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|---------------------------|---------------|
| 1      | Students familiarize with fundamentals concepts of Environmental Geography              | PSO-1   | R,U             | F                  | L                         |               |
| 2      | Understands the dynamics of man–environment relationship in various region of the world | PSO-1,2 | R,U, An         | F,C                | L                         |               |
| 3      | Students will learn about the types of biodiversity and the need for its conservation.  | PSO-1,4 | U, An           | C,M                | L                         | p             |
| 4      | Analyses different environmental policies.  | PSO-1   | An, E           | F, M               | L                         | p             |

|   |   |         |     |   |   |  |
|---|---|---------|-----|---|---|--|
| 5 | Create environmental awareness amongst the students | PSO-2,3 | U,C | M | L |  |
|---|---|---------|-----|---|---|--|

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | 3     | -     | -     | 3    | 3    | -    | -    | -    | -    | -    | -    |
| CO 3 | 3     | -     | -     | 3     | 3    | 3    | -    | -    | -    | -    | -    | -    |
| CO 4 | 3     | -     | -     |       | 3    | -    | -    | -    | -    | -    | -    | 3    |
| CO 5 | -     | 3     | 2     | -     | -    | -    | 3    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             | ✓          |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             | ✓          |            |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK3DSCGGY201</b>  |                  |                   |                    |                  |
| Course Title   | <b>OCEANOGRAPHY</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | <b>III</b>   |                  |                   |                    |                  |
| Academic Level | 200-299  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2                  | 5                |
| Pre-requisites | UK2DSCGGY100/UK2DSCGGY101/UK2DSCGGY102/UK2DSCGGY103/UK2DSCGGY104/UK2DSCGGY105/UK2DSCGGY106   |                  |                   |                    |                  |
| Course Summary | The paper has been designed to provide a comprehensive idea to the learners of geography into the world of oceans. The course is formally divided into different modules aiming to provide an essential foundation to the various reliefs of ocean floor, its temperature and saline properties, diverse oceanic movements and circulation, marine deposits, coral reefs, current threats to marine environment and few management policies in Indian context. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                | Content   | Hrs |
|------------|-------------------------------------|---|-----|
| <b>I</b>   | <b>Introduction to Oceanography</b> |   | 8   |
|            | 1                                   | Oceanography: Significance of Ocean Studies- Role of oceans in Climate regulator Transportation, Source of Food, Economic benefits & Recreation- Overview of World Oceans: Location-Area-Marginal seas                  |     |
|            | 2                                   | Relief of ocean floor- Bottom Topography of Pacific, Atlantic and Indian ocean  |     |
| <b>II</b>  | <b>Properties of Ocean Water</b>    |   | 9   |
|            | 3                                   | Temperature: Determinants – Horizontal and Vertical distribution  |     |
|            | 4                                   | Salinity: Determinants –Horizontal and Vertical distribution  |     |
| <b>III</b> | <b>Oceanic Movements</b>            |   | 10  |
|            | 5                                   | Ocean Waves: Wave crest and trough, Wave height, Wavelength, Wave period and Wave frequency- Types based on physical characteristics: Breaking waves-Spilling waves- Plunging waves-Surging waves and Collapsing waves. |     |
|            | 6                                   | Tides: Causes- Classification (based on position of sun, earth and moon/frequency)  |     |
|            | 7                                   | Currents: Factors influencing distribution of Ocean currents- Warm and Cold currents, Currents of Pacific, Atlantic and Indian Ocean.   |     |
| <b>IV</b>  | <b>Ocean Resources</b>              |   | 9   |
|            | 8                                   | Marine Deposits: Terrigenous Deposits - Pelagic Deposits (organic and inorganic)  |     |
|            | 9                                   | Coral Reefs- Formation- Classification: Fringing reefs/ Barrier reefs/  |     |

|   |                                    |  |   |
|---|------------------------------------|--|---|
|   |                                    | Atolls/Patch reefs   |   |
| V | <b>Challenges &amp; Management</b> |  | 9 |
|   | 10                                 | Marine pollution: Oil spill- Solid waste disposal- ocean acidification<br>Threats to marine environment: Over fishing- Rising temperature and<br>Sea level rise- Coral bleaching |   |
|   | 11                                 | Need for Integrated Coastal Zone Management- Coastal Regulation Zone<br>in India- Role of Mangroves in beach erosion   |   |

## PRACTICAL

(30 hours)

**Exercise 1:** Constructions of Map Scale (metric system)

**Exercise 2:** Conversion of scales: Statement scale to RF, RF to statement scale

**Exercise 3:** Construction of Graphic scale: Plain scale, Comparative scale and Time scale

**Exercise 4:** Illustration of bottom relief of ocean

**Exercise 5:** Illustration of currents of Pacific, Atlantic and Indian Ocean

**Exercise 6:** Field based study on quantification of beach plastic pollution

## References

- J.J. Bhatt (1978)., Oceanography: Exploring the Planet Ocean., D. Van Nostrand Company, New York.
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- Drake, Charles L.; Imbrie, John; Knauss, John A.; Turekian, Karl K.(1978)., Oceanography., Holt, Rinehart, and Winston, New York.
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- L.R.Singh (2022)., Fundamentals Of Practical Geography., Sharda Pustak Bhawan; 1st edition.

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- [https://oceanservice.noaa.gov/education/tutorial\\_currents/08references.html](https://oceanservice.noaa.gov/education/tutorial_currents/08references.html)

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to       | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Relate the current significance of oceans in our day to day life | U               | PSO-1,2       |
| CO-2 | Locate the significant relief features of major ocean bottoms    | R, U            | PSO-1         |
| CO-3 | Determine the ocean properties with their distribution           | Ap              | PSO-2         |
| CO-4 | Illustrate the various ocean currents of the world               | R, An           | PSO-1         |
| CO-5 | Correlate the ocean currents with weather phenomena's            | An              | PSO-3         |
| CO-6 | Assess the environmental issues associated with oceans           | E               | PSO-3, 4      |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: OCEANOGRAPHY**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/ PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|----------|-----------------|--------------------|--------------------------|---------------|
| 1      | Relate the current significance of oceans in our day to day life | PSO 1    | U               | C                  | L                        | -             |
| 2      | Locate the significant relief features of major ocean bottoms    | PSO 1    | R,U             | F,C                | L                        | P             |
| 3      | Determine the ocean properties with their distribution           | PSO 2    | Ap              | F,C                | L                        | -             |
| 4      | Illustrate the various ocean currents of the world               | PSO 1    | R, An           | F,C                | L                        | P             |
| 5      | Correlate the ocean currents with weather phenomena's            | PSO 3    | An              | M                  | L                        | -             |
| 6      | Assess the environmental issues associated with oceans           | PSO-3, 4 | E               | P,M                | L                        | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|      | PSO<br>1 | PSO<br>2 | PSO<br>3 | PSO<br>4 | PO<br>1 | PO<br>2 | PO<br>3 | PO<br>4 | PO<br>5 | PO<br>6 | PO<br>7 | PO<br>8 |
|------|----------|----------|----------|----------|---------|---------|---------|---------|---------|---------|---------|---------|
| CO 1 | 3        | -        | -        | -        | 3       | -       | -       | -       | -       | -       | -       | -       |
| CO 2 | 2        | -        | -        | -        | 3       | -       | -       | -       | -       | -       | 2       | -       |
| CO 3 | -        | 3        | -        | -        | -       | -       | 2       | -       | -       | -       | -       | -       |
| CO 4 | 3        | -        | -        | -        | 3       | -       | -       | -       | -       | 2       | 3       | -       |
| CO 5 | -        | -        | 2        | -        | -       | 2       | -       | -       | -       | -       | -       | -       |
| CO 6 | -        | -        | 3        | 2        | 3       | 2       | -       | -       | 3       | -       | 2       | 2       |

**Assessment Rubrics:**

- Quiz / Assignment
- Discussion / Seminar
- Midterm Exam
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             | ✓          |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          |            | ✓                         |
| CO 5 | ✓             |            |            | ✓                         |
| CO 6 | ✓             | ✓          | ✓          |                           |





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|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK3DSCGGY202</b>   |                  |                   |                    |                  |
| Course Title   | <b>COASTAL AND ESTUARINE OCEANOGRAPHY</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>  |                  |                   |                    |                  |
| Semester       | III   |                  |                   |                    |                  |
| Academic Level | 200-299   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites | UK2DSCGGY100/UK2DSCGGY101/UK2DSCGGY102/UK2DSCGGY103/UK2DSCGGY104/UK2DSCGGY105/UK2DSCGGY106  |                  |                   |                    |                  |
| Course Summary | It is a comprehensive course designed to provide students with a deep understanding of the coastal morphology and ecological significance of coastal and estuarine environment. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                      | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Meaning and Scope of Oceanography</b>  |   | 9   |
|            | 1   | Meaning, Scope, and development of oceanography   |     |
|            | 2   | Location, size, shape, and extent of major oceans   |     |
|            | 3   | Properties of Ocean water-salinity, temperature, density  |     |
| <b>II</b>  | <b>Coastal Morphology</b>                 |   | 9   |
|            | 4   | Coasts and shorelines, coastal morphology, coastal landforms, types of coastal environment, factors influencing coastal processes.                |     |
|            | 5   | Beaches –classification-beach configuration & profiles, beach erosion & accretion, long shore bars, sand spits, atolls, mud banks-beach stability |     |
|            | 6   | General bottom relief features-Pacific, Atlantic and Indian ocean   |     |
|            | 7   | Coastal regulation zones-Types and important  |     |
| <b>III</b> | <b>Estuary-Meaning and Classification</b> |   | 9   |
|            | 8   | Significance and classification   |     |
|            | 9   | Effect of river discharge and tides   |     |
|            | 10  | Salinity intrusion in estuaries and other issues associated with estuaries  |     |
| <b>IV</b>  | <b>Movements of Ocean Water</b>           |   | 9   |
|            | 11  | Waves-types   |     |
|            | 12  | Tides-types   |     |
|            | 13  | Currents  |     |
| <b>V</b>   | <b>Issues in Oceanography</b>             |   | 9   |
|            | 14  | Sea-level Rise and Beach Erosion  |     |
|            | 15  | Acidification   |     |
|            | 16  | Marine pollution  |     |

## PRACTICALS

(30 hours)

**Exercise 1:** Constructions of Map Scale (metric system), Conversion of scales: Statement scale to RF, RF to statement scale, Construction of Graphic scale: Plain scale, Comparative scale, and Time scale

**Exercise 2:** Sketching of major relief features of Pacific, Atlantic and Indian ocean, Illustration of currents of Pacific, Atlantic and Indian ocean, Field based study on quantification of beach plastic pollution

## References

- Beaches and Coasts: C A M King, Edward Arnold, 1961.
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- <https://encyclopedia2.thefreedictionary.com/estuarine+oceanography>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to              | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understand the fundamental concept of oceanography                      | U               | PSO-1         |
| CO-2 | Create a knowledge about various coastal environments and processes     | C               | PSO-1,3       |
| CO-3 | Understand the importance, types and problems associated with estuaries | U               | PSO-3         |
| CO-4 | Evaluate the dynamics of ocean water                                    | E               | PSO-1         |
| CO-5 | Analyse the challenges and issues facing in oceanography                | An              | PSO-4         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: COASTAL AND ESTUARINE OCEANOGRAPHY**

**Credits: 3 (Lecture: Practical: Tutorial)**

| CO No. | CO  | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the fundamental concept of oceanography                      | PSO-1   | U               | P                  | L                        |               |
| 2      | Create a knowledge about various coastal environments and processes     | PSO-1,3 | C               | F, P               | L                        |               |
| 3      | Understand the importance, types and problems associated with estuaries | PSO-3   | U               | C, M               | L                        |               |
| 4      | Evaluate the dynamics of ocean water                                    | PSO-1   | E               | F, C               | L                        |               |
| 5      | Analyse the challenges and issues facing in oceanography                | PSO-4   | An              | C, P               | L                        |               |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 1     | -     | -     | -     | 1    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 2     | -     | 3     | -     | 1    | -    | -    | -    | -    | -    | -    | -    |
| CO 3 | -     | -     | 1     | -     | 2    | -    | -    | -    | -    | -    | -    | -    |
| CO 4 | 3     | -     | -     | -     | -    | -    | -    | -    | -    | -    | -    | -    |
| CO 5 | -     | 1     | -     | 2     | -    | 3    | -    | -    | 1    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Project Evaluation | End Semester Examinations |
|------|---------------|------------|--------------------|---------------------------|
| CO 1 | ✓             |            |                    | ✓                         |
| CO 2 | ✓             |            |                    | ✓                         |
| CO 3 | ✓             |            |                    | ✓                         |
| CO 4 |               | ✓          |                    | ✓                         |
| CO 5 |               |            | ✓                  | ✓                         |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK3DSCGGY203</b>  |                  |                   |                    |                  |
| Course Title   | <b>PHYSICAL AND CULTURAL GEOGRAPHY OF INDIA</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | III  |                  |                   |                    |                  |
| Academic Level | 200 - 299  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2                  | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | The course focus with the basic ideas of physical, cultural and economic settings of India |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                 | Content   | Hrs |
|------------|--------------------------------------|---|-----|
| <b>I</b>   | <b>Physical Settings of India</b>    |   | 12  |
|            | 1                                    | India-Location-States- Union Territories- Neighbouring Countries  |     |
|            | 2                                    | Physical features – Major Physiographic Divisions   |     |
|            | 3                                    | Drainage Systems- Himalayan Rivers- Peninsular Rivers   |     |
|            | 4                                    | Indian Climate- Monsoon- Local Winds-Recent Cyclones  |     |
|            | 5                                    | Soil types – their characteristics and distribution   |     |
| <b>II</b>  | <b>Agriculture and Irrigation</b>    |   | 10  |
|            | 7                                    | Geographical distribution of major crops – Rice, Wheat, Millets, Cotton, Sugarcane, Tea, Coffee and Oil seeds |     |
|            | 8                                    | Irrigation in India – types – Multipurpose River Valley Projects  |     |
| <b>III</b> | <b>Resources and Industries</b>      |   | 7   |
|            | 9                                    | Minerals – iron ore, manganese, bauxite, mica and copper – their distribution;                                |     |
|            | 10                                   | Power resources –Hydel, Thermal and Atomic – distribution of Coal, Petroleum and Natural Gas                  |     |
| <b>IV</b>  | <b>Population and Urbanization</b>   |   | 7   |
|            | 12                                   | Distribution of population – Population, Density, Literacy, Sex-ratio   |     |
| <b>V</b>   | <b>Industries and Transportation</b> |   | 9   |
|            | 14                                   | Industries- Iron and Steel, Cotton Textile, Sugar and IT industries –   |     |
|            | 15                                   | Transport – Road, Railway, Inland Waterways and Airways – Major Ports   |     |

## PRACTICALS

(30 Hours)

**Exercise 1:** Preparation of Choropleth maps

**Exercise 2:** Preparation of Choroschematic maps

**Exercise 3:** Age-sex pyramid

**Exercise 4:** Illustration of weather symbols, Weather map interpretation

## References

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- Farmer B H: – An Introduction to South Asia, Methuen, London 1983.
- Learmonth ATA et.al (ed) : Man and Land of South Asia, Concept Publishers, New Delhi.
- Mitra A: Levels of Regional Development India, Census of India, Vol. I, Part I-A(i) and (ii) New Delhi, 1967.
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- [www.mospi.nic.in](http://www.mospi.nic.in)
- <https://mospi.gov.in/4-agricultural-statistics>
- <https://data.gov.in/resources>
- <https://data.gov.in/dataset-group-name/industries>
- <https://censusindia.gov.in/census.website/>
- <https://mospi.gov.in/51-annual-survey-industries>

## Course Outcomes

| No.  | Upon completion of the course the graduate will be able to | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand about major physiographic settings of India     | R,U             | PSO-1         |
| CO-2 | Appreciate Agricultural development of India               | R, U            | PSO-1         |
| CO-3 | Evaluate resources in India                                | E               | PSO-1,2       |

|      |  |      |         |
|------|--|------|---------|
| CO-4 | Analyses the Population and urban characteristics of India | U,An | PSO-1,2 |
| CO-5 | Understand transportation networks and industries of India | U    | PSO-1   |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: PHYSICAL AND CULTURAL GEOGRAPHY OF INDIA**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/PSO   | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|----------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand about major physiographic settings of India     | PSO-1    | R,U             | F                  | L                        | P             |
| 2      | Appreciate Agricultural development of India               | PSO-1    | R, U            | F                  | L                        | P             |
| 3      | Evaluate resources in India                                | PSO-1, 2 | E               | F                  | L                        | P             |
| 4      | Analyses the Population and urban characteristics of India | PSO-1,2  | U,An            | M                  | L                        | P             |
| 5      | Understand transportation networks and industries of India | PSO-1    | U               | F                  | L                        | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 2 | 3    | -    | -    | -    | 3   |     |     |     |     |     |     |     |
| CO 3 | 3    | 1    | -    | -    | 3   |     |     |     |     |     |     |     |
| CO 4 | 3    | 2    | -    | -    | 3   | 1   | -   |     |     | -   | -   | -   |
| CO 5 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             |            | ✓          | ✓                         |
| CO 3 | ✓             |            | ✓          | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             |            |            |                           |





**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK3DSCGGY204</b>  |                  |                   |                    |                  |
| Course Title   | <b>KERALA – LAND AND PEOPLE</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | III  |                  |                   |                    |                  |
| Academic Level | 200 - 299  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2                  | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | The course focuses on the basic knowledge of physical, cultural and economic settings in Kerala. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content  | Hrs |
|------------|---|--|-----|
| <b>I</b>   | <b>Physical Settings of Kerala</b>  |  | 9   |
|            | 1   | Location - Physiography  |     |
|            | 2   | Climate – Seasons  |     |
|            | 3   | Soil: types  |     |
|            | 4   | Drainage: East and West flowing rivers- Lakes-Wet lands- Water falls   |     |
| 5          | Natural Vegetation - Wildlife Sanctuaries- Community Reserve- National Parks- Environmental Protection Acts and movements: Silent valley, Plachimada struggle, Movements against Endosulfan |  |     |
| <b>II</b>  | <b>Agriculture, fishing and irrigation</b>  |  | 7   |
|            | 6   | Agriculture – Spatial distribution: Rice, Coconut, Rubber, Tea, Coffee, Pepper and Cardamom- Horticulture - Agricultural Research Centres In Kerala                        |     |
|            | 7   | Irrigation: Major Irrigation Projects in Kerala  |     |
|            | 8   | Fishing – Fishing Villages, Government programmes for fisheries development in Kerala  |     |
| <b>III</b> | <b>Resources and Industries</b>   |  | 10  |
|            | 9   | Mineral Resources – Distribution; Rare Earths and their distribution- KMML   |     |
|            | 10  | Power Resources – Capacity, Production and distribution of Hydroelectric Projects, Thermal Power Projects, Wind Energy Projects  |     |
|            | 11  | Industries in Kerala: - Coir Industry, Cashew Industry, Handlooms.   |     |
| 12         | Technology Parks in Kerala - Tourism Industry – Major natural and cultural tourist centres  |  |     |
| <b>IV</b>  | <b>Population and Transportation</b>  |  | 10  |
|            | 13  | Distribution and Growth of Population, Density, Literacy, Sex-ratio  |     |
|            | 14  | Kerala Social Welfare Schemes - SubhikshaKeralam, Jalasubhiksha, Karunya Health Scheme, Kudumbasree, OruNellumoruMeenum,E-Governance, Jalanidhi, Vanasree and Mazhapolima. |     |

|   |                            |  |   |
|---|----------------------------|--|---|
|   | 15                         | Roads, Railways, Waterways , Airways and Ports                           |   |
| V | <b>Kerala and Disaster</b> |  | 9 |
|   | 16                         | Natural hazard – Flood, Drought, Land slide, Coastal erosion – SDMA-DDMA |   |

## PRACTICALS

(30 Hours)

**Exercise 1:** A report on a recent disaster in Kerala.

**Exercise 2:** GPS mapping of the nearest tourist centres.

**Exercise 3:** Mobile mapping of nearby water bodies

**Exercise 4:** Conduct a field survey to assess the recent trends of migration in Kerala.

## References

- Geography of Kerala - Dr. SrikumarChattopadhyay
- Geography of Kerala – Dr. George Kurian.
- Economy of Kerala - Karunakaran and Sankaranarayanan
- Geomorphology of Kerala - V. Prasannakumar
- Striving for Sustainability: Environmental Stress and Democratic Initiatives in Kerala  
Dr. SrikumarChattopadhyay, Richard W Franke
- Gazetteer of Kerala - Kerala Gazetteer, Govt. of Kerala
- Water Atlas of Kerala - CWRDM, Kozhikode
- Resource Atlas of Kerala - Centre for Earth Science Studies
- District Census Handbooks - Directorate of Census Operations – Kerala

## Web References:

- <https://www.envis.ker.nic.in/>
- [https:// www.lsgkerala.gov.in/en/schemes](https://www.lsgkerala.gov.in/en/schemes)
- [https:// www.envt.kerala.gov.in/notifications-acts/](https://www.envt.kerala.gov.in/notifications-acts/)
- [https:// www.swd.kerala.gov.in](https://www.swd.kerala.gov.in)

## Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                   | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | To provide a comprehensive understanding on physiographic settings of Kerala | R,U             | PSO-1         |
| CO-2 | Appreciate Agricultural status of Kerala                                     | R, U            | PSO-1         |
| CO-3 | Evaluate resources and industries in Kerala                                  | E               | PSO-1,2       |
| CO-4 | Understanding Population characteristics and transport network of the state  | U               | PSO-1         |
| CO-5 | Analysis on disaster scenario of Kerala                                      | An              | PSO-1         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: KERALA – LAND AND PEOPLE**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| <b>CO No.</b> | <b>CO</b>  | <b>PO/P SO</b> | <b>Cognitive Level</b> | <b>Knowledge Category</b> | <b>Lecture (L) /Tutorial (T)</b> | <b>Practical (P)</b> |
|---------------|--|----------------|------------------------|---------------------------|----------------------------------|----------------------|
| 1             | To provide a comprehensive understanding on physiographic settings of Kerala | PSO-1          | R,U                    | F                         | L                                | -                    |
| 2             | Appreciate Agricultural status of Kerala                                     | PSO-1          | R, U                   | C                         | L                                | -                    |
| 3             | Evaluate resources and industries in Kerala                                  | PSO-1,2        | E                      | M                         | L                                | P                    |
| 4             | Understanding Population characteristics and transport network of the state  | PSO-1          | U                      | F                         | L                                | -                    |
| 5             | Analysis on disaster scenario of Kerala                                      | PSO-1          | An                     | M                         | L                                | P                    |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | <b>PSO 1</b> | <b>PSO 2</b> | <b>PSO 3</b> | <b>PSO 4</b> | <b>PO 1</b> | <b>PO 2</b> | <b>PO 3</b> | <b>PO 4</b> | <b>PO 5</b> | <b>PO 6</b> | <b>PO 7</b> | <b>PO 8</b> |
|------|--------------|--------------|--------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| CO 1 | 3            | -            | -            | -            | 1           | -           | -           | -           | -           | -           | -           | -           |
| CO 2 | 3            | -            | -            | -            | 2           | -           | -           | -           | -           | -           | -           | -           |
| CO 3 | 3            | 3            | -            | -            | 3           | 2           | -           | -           | -           | -           | -           | -           |
| CO 4 | 3            | -            | -            | -            | 2           | -           | -           | -           | -           | -           | -           | -           |
| CO 5 | 3            | -            | -            | -            | 2           | -           | -           | -           | -           | -           | -           | -           |

**Assessment Rubrics:**

- Quiz /Assignment/Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Quiz | End Semester Examinations |
|------|---------------|------------|------|---------------------------|
| CO 1 | ✓             | ✓          | ✓    | ✓                         |
| CO 2 | ✓             |            | ✓    | ✓                         |
| CO 3 | ✓             |            | ✓    | ✓                         |
| CO 4 | ✓             | ✓          | ✓    | ✓                         |
| CO 5 | ✓             |            |      |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK3DSCGGY205</b>  |                  |                   |                    |                  |
| Course Title   | <b>NATURAL RESOURCE MANAGEMENT IN INDIA</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | III  |                  |                   |                    |                  |
| Academic Level | 200-299  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2                  | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | Resource Management in India is a comprehensive course designed to provide students with a deep understanding of the management strategies, challenges, and opportunities concerning various resources in India. It will explore the complex interplay between environmental, social, and economic factors in resource management decisions, with a focus on fostering sustainable practices for the future. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content  | Hrs |
|------------|--|--|-----|
| <b>I</b>   | <b>Resource: Meaning and Classification</b>              |  | 6   |
|            | 1  | Meaning and characteristics of Natural Resource-Utility, Functionability, Acceptability, Obsolescence, Accessibility/feasibility                       |     |
|            | 2  | Resource classification –Biotic and Abiotic; Tangible and Intangible resource; Renewable & non-renewable resources; Ubiquitous and localised Resources |     |
| <b>II</b>  | <b>Natural Resource Management</b>                       |  | 10  |
|            | 3  | Concept, types and approaches of natural resource management   |     |
|            | 4  | National Natural Resource Management System (NNRMS).   |     |
|            | 5  | Geospatial Technology for NRM.   |     |
| <b>III</b> | <b>Land Resource Management</b>                          |  | 10  |
|            | 6  | Land use classes NRSC - Approaches and policies in India   |     |
|            | 7  | Land degradation: Causes and Consequences. Land Resource Use System: Shifting Cultivation, Transhumance and Integrated Farming System                  |     |
|            | 8  | Application of GIS and Remote Sensing in land resource management.   |     |
| <b>IV</b>  | <b>Water Resource Management</b>                         |  | 10  |
|            | 9  | Approaches and policies - wetland and water shed approach- National Ganga River Basin authority  |     |
|            | 10   | Water Induced Disaster and its Management  |     |
| <b>V</b>   | <b>Natural Resource Management Issues and Challenges</b> |  | 9   |
|            | 11   | Natural resource management and rural development  |     |
|            | 12   | Community based Natural Resource Management.   |     |
|            | 13   | Identification of key environmental issues and determination of priority   |     |

|  |    |   |  |
|--|----|---|--|
|  |    | order.  |  |
|  | 14 | DPSIR (Drivers-Pressure-State-Impact-Response) Analytical Framework.  |  |
|  | 15 | Environment Impact Assessment (EIA) and Social Impact Analysis (SIA). |  |
|  | 15 | Vulnerability Capacity Assessment.                                    |  |

## PRACTICAL

(30 Hours)

**Exercise 1 :** Field visit to any one of the following and writing a report on it.  
(Sewage treatment plant/Vermin composting unit/Rainwater harvesting system/Biogas plant/Solid waste management plant)

**Exercise 2 :** Resource identification and classification of natural resources of a local body

## References

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- Knowles R Wareing J (2000). Economic and Social Geography made simple, New Delhi, Rupa and Company.
- Prithwish Roy (2009), Economic Geography: A study of resources, New Central Book Agency (P) Ltd.
- H M Saxena (2013), Economic Geography Rawat Publications.
- Dr. Alka Gautam, 2015, Geography of resources, Exploitation, Conservation and Management.
- Sing ,Ramesh K .Resource Managenent in India
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- <https://learningforsustainability.net/mwa/dpsir/>
- <https://en.wikipedia.org/wiki/DPSIR>
- <http://moef.gov.in/moef/division/environment-divisions/environmental-impact-assessment-eia/introduction/index.html>
- <https://nmcg.nic.in/ngrbaread.aspx>
- [https://cpcb.nic.in/ngrba/About\\_us.php](https://cpcb.nic.in/ngrba/About_us.php)

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to   | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the concept and various types of resources  | U               | PSO-1         |
| CO-2 | Create knowledge about the significance of resource management in the Indian context.  | C               | PSO-1,3       |
| CO-3 | Understand the land resource management in India as well as the ability to evaluate land resource approaches and policies in India | U, E            | PSO-1         |
| CO-4 | Apply the sustainable water management strategies, including water conservation and integrated water resource                      | Ap              | PSO-3,4       |
| CO-5 | Analyse the challenges facing resource management in India   | An              | PSO-3         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: NATURAL RESOURCE MANAGEMENT IN INDIA**

**Credits: 3 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|-----|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | CO1 | PSO-1   | U               | P                  | L                        |               |
| 2      | CO2 | PSO-1,3 | C               | F,P                | L                        |               |
| 3      | CO3 | PSO-1   | U, E            | C,M                | L                        |               |
| 4      | CO4 | PSO-3,4 | E               | F,C                | L                        |               |
| 5      | CO5 | PSO-3   | An              | C,P                | L                        | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 2     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 2     | -     | 3     | -     | 2    | -    | -    | -    | -    | -    | -    | -    |
| CO 3 | 2     | -     | -     | 2     | 3    | -    | -    | -    | 1    | -    | -    | -    |
| CO 4 | -     | -     | 3     |       | -    | -    | -    | -    | -    | 3    | -    | -    |
| CO 5 | -     | -     | 3     | -     | -    | 1    | -    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            | ✓          | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 |               | ✓          | ✓          | ✓                         |
| CO 5 |               |            | ✓          |                           |





**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK3DSCGGY206</b>   |                  |                   |                    |                  |
| Course Title   | <b>WATER RESOURCE MANAGEMENT IN KERALA</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>  |                  |                   |                    |                  |
| Semester       | <b>III</b>  |                  |                   |                    |                  |
| Academic Level | 200-299   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3                | -                 | 2                  | 5                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | This course will enable students to understand and analyze various perspectives and problems of water resources in Kerala |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Water Resources in Kerala</b>                        |   | 15  |
|            | 1   | Water Resources – Meaning- Types - Significance of water resources  |     |
|            | 2   | Relationship between the topography and water resources of Kerala   |     |
| <b>II</b>  | <b>Rivers of Kerala</b>                                 |   | 15  |
|            | 3   | Introduction to river systems in Kerala                             |     |
|            | 4   | Characteristics of rivers of Kerala                                 |     |
|            | 5   | West flowing rivers in Kerala                                       |     |
|            | 6   | East flowing rivers in Kerala                                       |     |
| <b>III</b> | <b>Backwaters and Lakes in Kerala</b>                   |   | 15  |
|            | 7   | Origin of backwaters  |     |
|            | 8   | Major backwaters  |     |
|            | 9   | Freshwater lakes in Kerala  |     |
|            | 10  | Ramsar sites in Kerala  |     |
| <b>IV</b>  | <b>Challenges of Water Resources in Kerala</b>          |   | 15  |
|            | 11  | Water scarcity – causes and remedial measures                       |     |
|            | 12  | Flood – causes and mitigation measures                              |     |
|            | 13  | Water pollution   |     |
|            | 14  | Water quality assessment  |     |
| <b>V</b>   | <b>Water Resource Conservation Programmes in Kerala</b> |   | 15  |
|            | 15  | Watershed planning  |     |
|            | 16  | Riverbank mapping - Evolution and significance of riverbank mapping |     |
|            | 17  | Sand auditing programme   |     |

## PRACTICAL

(30 Hours)

**Exercises 1:** Illustration of any five rivers of Kerala with its major tributaries

**Exercises 2:** Field visit to any Ramsar sites in Kerala and prepare report on the Conservation strategies

### References

- Chattopadhyay, S., Mathai, J., P. G., T., Babu, S., Madhusoodanan, K., Shaji, J., & Saniya, N. (2020). Handbook on River Bank Mapping and Sand Auditing. Institute of Land and Disaster Management, Government of Kerala.
- Easa, P. S., & Jayakumar, K. V. (2015). Kerala's Water Resources: A Comprehensive Overview. Kerala State Biodiversity Board.
- Jayakrishnan, S. (2017). Water Resources of Kerala: Challenges and Opportunities. Springer.
- Mathew, C. V. (2019). The Rivers of Kerala: Management and Conservation Strategies. Oxford & IBH Publishing Co. Pvt. Ltd.
- Menon, R. S. (2018). Water Scarcity and Flood Management in Kerala: Issues and Solutions. TERI Press.
- Raju, R. (2016). Backwaters and Lakes of Kerala: Ecological Importance and Conservation Measures. Kerala University of Fisheries and Ocean Studies.
- Sivakumar, K. C. (2015). Watershed Management: Concepts and Applications. Wiley.
- Thomas, K. T., & Sreekumar, G. (2017). Challenges in Water Resource Management: Kerala Perspective. Kerala Institute of Local Administration.
- Viswanathan, P. K. (2019). Watershed Approach to Sustainable Development. Cambridge Scholars Publishing.

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- [https://www.researchgate.net/publication/337652343\\_Surface\\_Water\\_and\\_Groundwater\\_Resources\\_of\\_Kerala\\_Management\\_Issues\\_Policies\\_Future\\_Strategies\\_Surface\\_Water\\_and\\_Groundwater\\_Resources\\_of\\_Kerala\\_Management\\_Issues\\_Policies\\_Future\\_Strategies](https://www.researchgate.net/publication/337652343_Surface_Water_and_Groundwater_Resources_of_Kerala_Management_Issues_Policies_Future_Strategies_Surface_Water_and_Groundwater_Resources_of_Kerala_Management_Issues_Policies_Future_Strategies)
- <https://www.epa.gov/nps/handbook-developing-watershed-plans-restore-and-protect-our-waters>
- [https://www.academia.edu/43284031/Handbook\\_on\\_River\\_Bank\\_Mapping\\_and\\_Sand\\_Auditing](https://www.academia.edu/43284031/Handbook_on_River_Bank_Mapping_and_Sand_Auditing)

### Course Outcomes

| No.  | Upon completion of the course, the graduate will be able to               | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understand the importance of water resources and the topography of Kerala | U               | PSO-1         |
| CO-2 | Classify the rivers of Kerala based on their direction                    | U,R             | PSO-1         |
| CO-3 | Differentiate backwaters in Kerala  | U,R             | PSO-1         |
| CO-4 | Determine the challenges faced by water resources in                      | E,An            | PSO-1,2       |

|      |  |   |         |
|------|--|---|---------|
|      | Kerala   |   |         |
| CO-5 | Evaluate water resources conservation programmes in Kerala | E | PSO-2,3 |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: WATER RESOURCE MANAGEMENT IN KERALA**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PS O | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the importance of water resources and the topography of Kerala | PSO-1   | U               | F                  | L                        | -             |
| 2      | Classify the rivers of Kerala based on their direction                    | PSO-1   | U,R             | F                  | L                        | -             |
| 3      | Differentiate backwaters in Kerala  | PSO-1   | U,R             | F                  | L                        | -             |
| 4      | Determine the challenges faced by water resources in Kerala               | PSO-1,2 | E,An            | M                  | L                        | -             |
| 5      | Evaluate water resources conservation programmes in Kerala                | PSO-2,3 | E               | M                  | L                        | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 2 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 3 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 4 | 1    | 2    | -    | -    | 1   | 2   | 1   | -   | -   | -   | -   | -   |
| CO 5 | -    | 1    | 2    | -    | 2   | -   | -   | -   | -   | -   | -   | 1   |

**Assessment Rubrics:**

- Quiz / Assignment/Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             | ✓          |            | ✓                         |
| CO 3 | ✓             | ✓          | ✓          | ✓                         |
| CO 4 | ✓             |            |            | ✓                         |
| CO 5 | ✓             |            |            |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK3DSEGGY200</b>   |                  |                   |                    |                  |
| Course Title   | <b>INFORMATION TECHNOLOGY IN GEOSCIENCES</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>  |                  |                   |                    |                  |
| Semester       | III   |                  |                   |                    |                  |
| Academic Level | 200-299   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 4 hours          | -                 | -                  | 4                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | This course provides an introduction to applications of Information Technology in Earth Science studies |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                      | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Introduction to Computers</b>          |   | 12  |
|            | 1   | Introduction to Computers : Hardware, Software and Data                   |     |
|            | 2   | Software: System, Application, Enterprise, Freeware and Open source       |     |
|            | 3   | Data Encoding : Attributes, Pros and Cons of ASCII,UNICODE schemes        |     |
|            | 4   | OS : Types and Functions, Types of Memory, Programming Languages          |     |
| <b>II</b>  | <b>Communication and Networks</b>         |   | 12  |
|            | 5   | Communication Types: Wired and Wireless, Advantages and Applications      |     |
|            | 6   | Types of Networks: LAN, WAN, MAN,EPN,VPN                                  |     |
|            | 7   | Web browser, Internet, IP Address, Types of Web servers, HTTP             |     |
| <b>III</b> | <b>Data Base Management System</b>        |   | 12  |
|            | 8   | Introduction to DBMS : Concept, Purpose and brief history of DBMS         |     |
|            | 9   | Database architecture : Types and advantages of 1-tier,2-tier,3-tier DBMS |     |
|            | 10  | Database Languages : DDL,DML,DCL,DRL-Structured Query Language            |     |
|            | 11  | RDBMS,OODBMS, NoSQL DBMS-Spatial data bases for Geosciences               |     |
| <b>IV</b>  | <b>Spatial Data Models in Geosciences</b> |   | 12  |
|            | 12  | Spatial Data : Map Data, Attribute Data and Image Data                    |     |
|            | 13  | Models of Spatial Information : Field Models and Object Models            |     |
|            | 14  | Raster File Types and Extensions : IMG,JPEG,ASCII,GeoTIFF, Esri Grid      |     |
|            |   | Vector File Types : Shapefile, GeoJSON, KML,GML, GPX, Coverage            |     |
|            | <b>Introduction to Programming</b>        |   |     |
| <b>V</b>   | 15  | C programming : Keywords, Data types, Variables, Constants, Operators     | 12  |
|            | 16  | Key features of Python : Variables, Data types and Python Operators       |     |
|            | 17  | R programming in GIS : Fundamental Concepts and Advantages                |     |

## References

- Computer Fundamentals: Concepts, Systems & Applications Sinha, P. K, P. 4th ed
- Computer Networks & Internets: With Internet Applications, Comer, D. E/ Narayanan, M. S. 4th ed Pearson
- Efraim.T, Rainer;R.K, Introduction to Information Technology, John Wiley & Sons
- Computer Networks: Protocols, Standards & Interfaces Black, Uyles 2nd ed PHI
- Gottfried, B.S.: Programming with C, Tata McGraw Hill Publishing Co. Ltd.
- Programming in C by Jamwal Shubhnanandan, Pearson Publications
- Paul L. Meyer: Introductory Probability and statistical Applications, Wesley. C
- E. Balaguruswamy: Programming in ANSIC, Tata McGraw Hill Publishing Co. Ltd.
- Introduction to Data Structure (Array, Stack, Linked List, Q
- Gupta .S.C and Kapoor .V.K, Fundamentals of Mathematical Statistics, Chand and sons

## Web References

- <https://edu.gcfglobal.org>
- <https://onlinecourses.nptel.ac.in>
- <https://www.oracle.com/>
- <https://www.javatpoint.com>
- <https://www.coursera.org>
- <https://www.geeksforgeeks.org>
- <https://towardsdatascience.com>
- <https://pro.arcgis.com>
- <https://desktop.arcgis.com>

## Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                              | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Recall and summarize basics of Information Technology, Computers, Software, Data and OS | U               | PSO-1,3       |
| CO-2 | Compare and set up wired and wireless networks  | An,C            | PSO-1         |
| CO-3 | Appraise and design DBMS and SQL  | E,C             | PSO-1,3       |
| CO-4 | Discuss spatial data models and file formats  | U               | PSO-1,3       |
| CO-5 | Examine appropriate Programming language for Spatial data analysis                      | An              | PSO-1         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: INFORMATION TECHNOLOGY IN GEOSCIENCES**

**Credits: 4:0:0 (Lecture Tutorial: Practical)**

| CO No. | CO  | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Recall and summarize basics of Information Technology, Computers, Software, Data and OS | PSO-1,3 | U               | P                  | L                        | -             |
| 2      | Differentiate and set up wired and wireless networks                                    | PSO-1   | An, C           | M                  | L                        | -             |
| 3      | Design DBMS and SQL   | PSO-1,3 | C               | M                  | L                        | -             |
| 4      | Discuss spatial data models and file formats  | PSO-1,3 | U               | F                  | L                        | -             |
| 5      | Evaluate appropriate Programming language for Spatial data analysis                     | PSO-1   | E               | C                  | L                        | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | 3     | -    | -    | -    | -    | -    | -    | -    | 3    | -    |
| CO 2 | 3     | -     | -     | -    | 3    | -    | -    | -    | -    | -    | 3    | -    |
| CO 3 | 3     | -     | 2     | -    | 3    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 4 | 3     | -     | 3     | -    | -    | -    | -    | -    | -    | -    | 3    | -    |
| CO 5 | 3     | -     | -     | -    | -    | -    | -    | -    | -    | 2    | 3    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            | ✓          | ✓                         |
| CO 3 | ✓             | ✓          |            | ✓                         |
| CO 4 | ✓             | ✓          |            | ✓                         |
| CO 5 |               |            |            |                           |





**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK3DSEGGY201</b>   |                  |                   |                    |                  |
| Course Title   | <b>BASIC GEODESY</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>  |                  |                   |                    |                  |
| Semester       | <b>III</b>  |                  |                   |                    |                  |
| Academic Level | 200 - 299   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | This course aims to provide fundamental concepts and principles of Geodesy, Land Surveying and Introduction to Modern Surveying |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                 | Content   | Hrs |
|------------|--------------------------------------|---|-----|
| <b>I</b>   | <b>Introduction to Geodesy</b>       |   | 8   |
|            | 1                                    | Introduction to Geodesy : Definitions - History of Geodesy            |     |
|            | 2                                    | Spherical Earth-Ellipsoidal Earth-Geoid-Geographical Coordinates      |     |
|            | 3                                    | Directions and Azimuth-Influence of the Earth curvature to surveying. |     |
| <b>II</b>  | <b>Datum and CRS</b>                 |   | 8   |
|            | 4                                    | Datum and Coordinate Reference Systems-Vertical and Horizontal Datum  |     |
|            | 5                                    | Cartesian vs. Geographic Coordinates-Geographic and Projected CRS     |     |
|            | 6                                    | World Geodetic System   |     |
| <b>III</b> | <b>Measurements: Area and Height</b> |   | 10  |
|            | 7                                    | Horizontal and vertical measuring of directions, angles and slopes    |     |
|            | 8                                    | Earth's Gravity field - Linear measurement-Direct                     |     |
|            | 9                                    | Optical and Electronic measurement-Methods-Accuracy                   |     |
|            | 10                                   | Horizontal and vertical control points- Mean Sea Level                |     |
|            | 11                                   | Measurement of Area-Orthometric Elevations vs. Ellipsoid Heights      |     |
| <b>IV</b>  | <b>Land Surveying</b>                |   | 10  |
|            | 12                                   | Land Surveying : Classification - Topographic Surveying and Mapping   |     |
|            | 13                                   | Triangulation - Traversing - Benchmarks - Contouring                  |     |
|            | 14                                   | Differential Survey - Great Trigonometrical Survey of India           |     |
|            | 15                                   | Cadastral Surveying - Major Surveying Agencies of the world           |     |
| <b>V</b>   | <b>Modern Geodesy</b>                |   | 9   |
|            | 16                                   | Modern Techniques in Geodesy: Satellite geodesy-GPS                   |     |
|            | 17                                   | Radar altimetry-InSAR- Applications.                                  |     |

## PRACTICALS

(30 hours)

**Exercise 1:** Measurement of Directions, Angles

**Exercise 2:** Measurement of Slopes

**Exercise 3:** Calculation of Distance, Area from Topographical Maps

**Exercise 4:** Mapping with Cadastral sheets

## References

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- Petr Vaníček and Edward J., Geodesy: The concepts, North-Holland Publins. Co., 1991.
- Tom Herring, "Geodesy, Elsevier, 2009.
- Schwarze, V. S. Geodesy: The challenge of the 3rd millennium, Springer Verlag, 2002.
- James R. Smith, "Introduction to Geodesy", John Wiley & Sons Inc. 1997.
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- [http://www.fao.org/tempref/FI/CDrom/FAO\\_Training/General/x6707e/x6707e07.htm](http://www.fao.org/tempref/FI/CDrom/FAO_Training/General/x6707e/x6707e07.htm)
- Bomford, G., 2010. Geodesy, Oxford University Press.
- Vaníček, P., Krakiwsky, E. J., 1987. Geodesy: The concept, Elsevier Science.

## Web References

- <https://oarklibrary.com>
- <https://www.semanticscholar.org>

## Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                 | Cognitive Level | PSO   |
|------|--|-----------------|-------|
| CO-1 | Understand and explain Concept of geodesy, its history                     | U               | PSO-1 |
| CO-2 | Classify Coordinate reference systems and map projections                  | U               | PSO-3 |
| CO-3 | Illustrate and explain measurement of directions, angles, slopes and areas | Ap              | PSO-3 |
| CO-4 | Discriminate various methods of Land surveying                             | An              | PSO-3 |
| CO-5 | Summarize modern techniques in geodesy                                     | U               | PSO-1 |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: BASIC GEODESY**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|--------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand and explain Concept of geodesy, its history                     | PSO-1  | U               | F                  | L                        | -             |
| 2      | Classify Coordinate reference systems and map projections                  | PSO-3  | U               | P                  | L                        | -             |
| 3      | Illustrate and explain measurement of directions, angles, slopes and areas | PSO-3  | Ap              | F                  | L                        | -             |
| 4      | Discriminate various methods of Land surveying                             | PSO-3  | An              | P                  | L                        | P             |
| 5      | Summarize modern techniques in geodesy                                     | PSO-1  | U               | P                  | L                        | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 2    | -    | -    | 3    | -    | -    | -    | -    |
| CO 2 | -     | -     | 2     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 3 | -     | -     | 2     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 4 | -     | -     | 2     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 5 | 3     | -     | -     | -     | 2    | -    | -    | 3    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 |               |            |            |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK3DSEGGY202</b>  |                  |                   |                    |                  |
| Course Title   | <b>INTRODUCTION TO HAZARDS AND DISASTERS</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | III  |                  |                   |                    |                  |
| Academic Level | 200-299  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 4 hours          | -                 |                    | 4                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | It provides a basic conceptual understanding of disasters, its causes and impacts, and an analytical view of Kerala floods |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content  | Hrs |
|------------|--|--|-----|
| <b>I</b>   | <b>Introduction to Hazards And Disasters</b> |  | 12  |
|            | 1  | Introduction to Disaster and Disaster Management : Meaning and concept   |     |
|            | 2  | Hazards vs Disasters, Vulnerability, Resilience, Disaster Prevention   |     |
|            | 3  | Disaster mitigation, Disaster relief and response, disaster risk assessment                                    |     |
|            | 4  | Multidisciplinary nature of disaster management, allied disciplines  |     |
| <b>II</b>  | <b>Classification of Disasters</b>           |  | 12  |
|            | 5  | Typologies of disasters: Cataclysmic, Slow, Onset  |     |
|            | 6  | Types of disasters :Natural and manmade- Magnitude of Disasters  |     |
|            | 7  | Hybrid disasters; Compounded effects of human and natural forces   |     |
| <b>III</b> | <b>Impacts of Disasters</b>                  |  | 12  |
|            | 8  | Consequences and impacts of disasters : Floods, Cyclones, Tsunami, Earthquakes, Landslides, Volcanic eruptions |     |
|            | 9  | Desertification, Drought, Salinity ingress   |     |
| <b>IV</b>  | <b>Floods in Kerala</b>                      |  | 12  |
|            | 10   | Floods in Kerala- : A historical perspective   |     |
|            | 11   | 2018 Kerala floods: An Overview  |     |
|            | 12   | Urban flash floods in Kerala: Causes and Consequences  |     |
|            | 13   | Structural and Non-structural measures for the Prevention of floods  |     |
| <b>V</b>   | <b>Response to Disaster</b>                  |  | 12  |
|            | 14   | Challenges in Disaster Management  |     |
|            | 15   | Community based disaster management  |     |
|            | 16   | Indigenous knowledge in disaster mitigation  |     |

**References**

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- Vaidyanathan S (2020), An Introduction to Disaster Management: Natural Disasters and Man Made Hazards

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- <https://oxfordre.com/naturalhazardscience/display/10.1093/acrefore/9780199389407.001.0001/acrefore-9780199389407-e-47>

### Course Outcomes

| No.   | Upon completion of the course the graduate will be able to                   | Cognitive Level | PSO addressed |
|-------|--|-----------------|---------------|
| CO-1  | Determine and understand the various concepts related to disaster management | U               | PSO-1         |
| CO-2  | To analyze various types of disasters  | U,An            | PSO-1,3       |
| CO- 3 | Analyze the cause and effect of natural hazards and disasters.               | U,An            | PSO-1,3       |
| CO- 4 | Evaluate Kerala flood  | E,An            | PSO-3         |
| CO -5 | Create awareness in response to disaster                                     | C,E             | PSO-1,4       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: INTRODUCTION TO HAZARDS AND DISASTERS**

**Credits: 4:0:0 (Lecture Tutorial: Practical)**

| CO No. | CO   | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|--------|-----------------|--------------------|--------------------------|---------------|
| CO-1   | Determine and understand the various concepts related to disaster management | PSO-1  | U               | F                  | L                        | -             |

|      |  |         |      |     |   |   |
|------|--|---------|------|-----|---|---|
| CO-2 | To analyze various types of disasters                          | PSO-1.3 | U,An | F   | L | - |
| CO-3 | Analyze the cause and effect of natural hazards and disasters. | PSO-1,3 | U,An | F,M | L | - |
| CO-4 | Evaluate Kerala flood  | PSO-3   | E,An | F   | L | - |
| CO-5 | Create awareness in response to disaster                       | PSO-1,4 | C,E  | M   | L | - |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO1 | PSO2 | PSO3 | PSO 4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO 6 | PO 7 | PO 8 |
|------|------|------|------|-------|-----|-----|-----|-----|-----|------|------|------|
| CO 1 | 3    | -    | -    | -     | 3   | -   | -   | -   | -   | -    | -    | -    |
| CO 2 | 3    | -    | 1    | -     | 3   | -   | -   | -   | -   | -    | -    | -    |
| CO 3 | 2    | -    | 2    | -     | 3   | -   | -   | -   | -   | -    | -    | -    |
| CO 4 |      | -    | 3    | -     | 2   | 1   | -   | -   | -   | -    | -    | -    |
| CO 5 | 1    | -    | -    | 2     | 1   | 2   | -   | -   | -   | -    | -    | 2    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             | ✓          |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             |            |            |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK3DSEGGY203</b>  |                  |                   |                    |                  |
| Course Title   | <b>RURAL NATURAL RESOURCES - ECOLOGY AND SUSTAINABLE DEVELOPMENT</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | <b>III</b>   |                  |                   |                    |                  |
| Academic Level | 200-299  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3                | -                 | 2                  | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | The course will provide an understanding of the basic characteristics of rural life, the ecological behaviour that shape their existence, the sustainable nature of understanding its components and problems. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module    | Unit                           | Content  | Hrs      |
|-----------|--------------------------------|--|----------|
| <b>I</b>  | <b>Rural Natural Resources</b> |  | <b>9</b> |
|           | 1                              | Agricultural Resources- practise of agriculture in villages- season and traditions of agriculture- Farmer ,crop yield and market relations- their character and problems& Fisheries Resources- Character of fishing villages- significance and problems                      |          |
|           | 2                              | Forest Resources- Lumbering- History- Influence of village with peripheral zone- Case study of Edamalakkudy village Kerala   |          |
|           | 3                              | Mineral resources- Positive and Negative modification of Mineral exploration areas-Guntur, Kolar and Raichur in India- African Villages and Minerals   |          |
|           | 4                              | Tourism Resources-Factors for origin of tourist village- Farm tourism- Rural tourism- types and challenges   |          |
| <b>II</b> | <b>Rural Infrastructure</b>    |  | <b>9</b> |
|           | 5                              | Rural Transportation system- Type with space examples- Pedestrian- Personal vehicle- Public vehicle- Buses- Boat- Train- Air service- Transit systems- Fixed route- Flex route- Demand Response transit- Volunteer transportation- Transit vanpools- Barriers in rural areas |          |
|           | 6                              | Electrification – present scene around world- Social and economic benefits- Case study of Kanjikode village and Velappankandi tribal hamlet in Kerala  |          |
|           | 7                              | Rural Water Supply systems- Rain water based systems- Ground water based systems-Surface water supply systems-Brief evaluation of activities and management of Kerala Rural Water Supply and Sanitation Agency (KRWSA)   |          |
|           | 8                              | Morphology of Rural Housing- Programs of Rural Housing in India- Problems of rural housing   |          |



|            |  |  |   |
|------------|--|--|---|
| <b>III</b> | <b>Rural Livelihood</b>  |  | 9 |
|            | 9  | Agricultural labourer- Farmer-Difference-farmer with other source of income- Rich farmers -land owners – Peasant- Zamindari system in Indian subcontinent  |   |
|            | 10   | Social Mobilization – Need of rural social mobilization- Elements of social mobilization-Case study of Kudumbasree- Social Inclusion- Role of social inclusion in Education- Social Inclusion programs |   |
|            | 11   | Rural health-Rural Health statistics in India-Activities of National Rural Health Mission (NRHM)- Rural Poverty and Food Security- Rural Sustainable Development                                       |   |
| <b>IV</b>  | <b>Ecology: Machinery of Rural Resources</b>                             |  | 9 |
|            | 12   | Rural Employment- National Rural Employment Generation Scheme (NREGA)-Problems   |   |
|            | 13   | Rural Energy Generation - Case Studies of Bangladesh, Austria and Guyana   |   |
| <b>V</b>   | <b>Cross Cutting Issues &amp; Theories: Gender and Rural Development</b> |  | 9 |
|            | 14   | Gender Equality and Rural Sustainable development- Gender issues   |   |
|            | 15   | Theories to Sustainable development: Basic Resource Theory-System Theory-Power structure Theory-Growth Centre theory   |   |

## PRACTICALS

(30 hours)

**Exercise 1:** A field visit to a nearby rural area (politically demarcated) and make a report on any two cases as prescribed from 1 to 13 above modules.

**Exercise 2:** Application of any one theory as prescribed under no.14 module 5 with the area of visit and submit as a report with proper mapping.

## References

- Arthur N Strahler and Alan H Strahler (1998) Modern Physical Geography, John Wiley and Sons, Inc.
- Bloom, A.L. (1991): Geomorphology, 2nd Ed Englewood Cliffs, M.J. Prentice Hall
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- Clayton et al, Rural Planning in Developing Countries, Earthscan
- Misra R.N., Rural Development and Population, Anmol Publications Pvt.Ltd, New Delhi
- Prasad R.R& Rajanikanth, Rural Development and Social change, Vol 2, Discovery Publishing House, New Delhi
- Reddy V et al, Methods of teaching Rural Sociology, Discovery Publishing House, New Delhi

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- <https://www.bbc.co.uk/bitesize/topics/zshp34j/articles/zqwpsk7>
- <https://www.india.gov.in/topics/housing/rural-housing>
- <https://www.britannica.com/topic/sustainable-development>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to    | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | To understand various rural natural resources                 | U               | PSO-1         |
| CO-2 | To analysing various rural infrastuctures                     | An              | PSO-1         |
| CO-3 | To analysing the socio-economic conditions of rural area      | An              | PSO-1,2       |
| CO-4 | To analysing the rural employment and energy generation       | An              | PSO-1         |
| CO-5 | To evaluate gender equality and rural sustainable development | E               | PSO-1         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: RURAL NATURAL RESOURCES: ECOLOGY AND SUSTAINABLE DEVELOPMENT**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PS O | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | To understand various rural natural resources | PSO-1   | U               | F                  | L                        | P             |
| 2      | To analysing various rural infrastuctures     | PSO-1   | An              | F                  | L                        | P             |

|   |   |         |    |     |   |   |
|---|---|---------|----|-----|---|---|
| 3 | To analysing the socio-economic conditions of rural area      | PSO-1,2 | An | F   | L | P |
| 4 | To analysing the rural employment and energy generation       | PSO-1   | An | F   | L | P |
| 5 | To evaluate gender equality and rural sustainable development | PSO-1   | E  | F,M | L | P |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
|------|------|------|------|------|-----|-----|-----|-----|-----|-----|
| CO 1 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   |
| CO 2 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   |
| CO 3 | 2    | 2    | -    | -    | 3   | -   | -   | -   | -   | -   |
| CO 4 | 3    | -    | -    | -    | 2   | -   | -   | -   | -   | -   |
| CO 5 | 2    |      | -    | -    | 2   | 2   | -   | -   | -   | -   |

**Assessment Rubrics:**

- Quiz / Assignment / Discussion / Seminar/Survey
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             | ✓          | ✓          | ✓                         |
| CO 3 | ✓             | ✓          | ✓          | ✓                         |
| CO 4 | ✓             | ✓          |            | ✓                         |
| CO 5 | ✓             | ✓          |            |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK3DSEGGY204</b>   |                  |                   |                    |                  |
| Course Title   | <b>URBAN GEOGRAPHY</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>  |                  |                   |                    |                  |
| Semester       | III   |                  |                   |                    |                  |
| Academic Level | 200 - 299   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | Urban Geography focuses on cities, Growth and Evolution, Classification of Urban Centres, Urban morphology, Contemporary Urban Issues, different urban planning concepts and new trends towards futuristic cities |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content  | Hrs |
|------------|--|--|-----|
| <b>I</b>   | <b>Urban Geography</b>                               |  | 8   |
|            | 1  | Definition, Objective and Scope of urban geography   |     |
|            | 2  | Origin and Evolution of Urban Centres  |     |
|            | 4  | Factors associated with the growth of Cities.  |     |
| <b>II</b>  | <b>Urban Systems and Organization Of Urban Space</b> |  | 10  |
|            | 5  | Urban Systems: Concept of National Urban System  |     |
|            | 6  | Central Place Theory of Christaller and Losch  |     |
|            |  | Classification of Urban Centres on the basis of a)Size, b)Function                             |     |
|            | 7  | Rank-Size Rule ; Harris and Nelson's Scheme of Classification; Primate City distribution       |     |
|            | 8  | Classification of Indian Cities by Ashok Mitra.  |     |
| <b>III</b> | <b>Urban Morphology</b>                              |  | 10  |
|            | 9  | Organization of urban space: Urban morphology and land use structure                           |     |
|            | 10   | City-region relations, urban sprawl  |     |
|            | 11   | Umland and periphery; Rural-Urban Fringe   |     |
|            | 12   | Theories of city structure --Burgess, Hoyt, Harris   |     |
|            | 13   | Central Business District and its Characteristics  |     |
|            | 14   | Morphology of Indian Cities -Varanasi and Chandigarh   |     |
| <b>IV</b>  | <b>Contemporary Urban Issues</b>                     |  | 8   |
|            | 15   | Contemporary Urban Issues: Urban Poverty and Urban Crime ;Slums; Transportation; Urban Housing |     |
|            | 16   | Urban Infrastructure - Urban Finance - Environmental Pollution                                 |     |
|            | 17   | Heat Island  |     |
| <b>V</b>   | <b>Urban Planning and Futuristic Cities</b>          |  | 9   |
|            | 18   | Concept and History of urban planning,   |     |

|  |    |  |  |
|--|----|--|--|
|  | 19 | Concept of Master Plans: Types of Urban Schemes, formulation and Implementation  |  |
|  | 20 | Methods of Urban land use planning, Urban Policy and programmes in India.  |  |
|  | 21 | Concept of New Urbanism; Concepts of futuristic cities- Sustainable city, smart city, compact city, virtual city, network city, world class city, global city and inclusive city |  |

## PRACTICALS

(30 hours)

**Exercise 1:** Classification of Urban Centres based on size and Function

**Exercise2:** Analyse the urbanisation trend of nearest urban local body using census data.

## References

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- <https://planningtank.com/settlement-geography/rank-size-rule-by-george-zipf-1949>
- <https://planningtank.com/settlement-geography/rural-urban-fringe>
- <https://ourworldindata.org/urbanization>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                         | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | To familiarize student with the nature and scope of urban geography.               | U               | PSO-1         |
| CO-2 | To understand about urban systems and organization of urban space                  | U               | PSO-1         |
| CO-3 | To understand the morphology and hierarchy in urban system                         | U               | PSO-1         |
| CO-4 | To analyse about the importance of urban issues in mega- cities.                   | An              | PSO-1,3       |
| CO-5 | To understand the urban planning, governance and new concepts of futuristic cities | Ap,U            | PSO-1,3       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: URBAN GEOGRAPHY**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/ PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | To familiarize student with the nature and scope of urban geography. | PSO-1   | U               | F, C               | L                        |               |
| 2      | To understand about urban systems and organization of urban space    | PSO-1   | U               | C                  | L                        | P             |
| 3      | To understand the morphology and hierarchy in urban system           | PSO-1   | U               | M                  | L                        |               |
| 4      | To analyse about the importance of urban issues in mega- cities.     | PSO-1,3 | An              | P                  | L                        |               |

|   |  |         |      |   |   |   |
|---|--|---------|------|---|---|---|
| 5 | To understand the urban planning, governance and new concepts of futuristic cities | PSO-1,3 | Ap,U | M | L | P |
|---|--|---------|------|---|---|---|

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
|------|------|------|------|------|-----|-----|-----|-----|-----|-----|
| CO 1 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   |
| CO 2 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   |
| CO 3 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   |
| CO 4 | 2    | -    | 2    | -    | 2   | 1   | -   | -   | -   | -   |
| CO 5 | 3    | -    | 1    | -    | 3   | -   | -   | -   | -   | -   |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          |            | ✓                         |
| CO 5 | ✓             | ✓          | ✓          |                           |



## University of Kerala

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK3VACGGY200</b>   |                  |                   |                    |                  |
| Course Title   | <b>GEOGRAPHY OF HEALTH AND ENVIRONMENT</b>  |                  |                   |                    |                  |
| Type of Course | <b>VAC</b>  |                  |                   |                    |                  |
| Semester       | III   |                  |                   |                    |                  |
| Academic Level | 200 - 299   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 3   | 3 hours          | -                 | -                  | 3                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | Explores the ways in which human-environment interactions impact on human health and disease. |                  |                   |                    |                  |

### Detailed Syllabus:

| Module     | Unit   | Content   | Hrs |
|------------|--|---|-----|
| <b>I</b>   | <b>Perspectives on Health</b>  |   | 6   |
|            | 1  | Health-Definition; linkages with environment  |     |
|            | 2  | Driving forces in health and environmental trends- Population dynamics, urbanization, poverty and inequality  |     |
| <b>II</b>  | <b>Pressure on Environmental Quality and Health:</b>                                       |   | 10  |
|            | 4  | Human activities and environmental pressure-land use and agricultural development   |     |
|            | 5  | Industrialisation, Transport and Energy.  |     |
| <b>III</b> | <b>Exposure and Health Risks</b>   |   | 10  |
|            | 6  | Exposure and Health Risks: Air and water pollution household wastes; housing; workplace   |     |
| <b>IV</b>  | <b>Health and Disease Pattern in Environmental Context with special reference to India</b> |   | 10  |
|            | 7  | Types of Diseases and their regional pattern (Communicable and Lifestyle related diseases)  |     |
| <b>V</b>   | <b>Climate Change and Human Health</b>   |   | 9   |
|            | 8  | Climate change and human health-Extreme weather events-Heat wave, cold wave, Drought, Heavy precipitation, Cyclone and flood-Vector borne diseases-Disruption of food systems |     |

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### Web references

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### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to           | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the key concepts related to health and its driving forces | U               | PSO-1         |
| CO-2 | Identify the linkages between the health, environment, exposure      | U               | PSO-1         |
| CO-3 | Evaluate the impact of pollution to human health                     | E               | PSO-2         |
| CO-4 | Acquire knowledge about diseases and their regional pattern          | U, An           | PSO-1,3       |
| CO-5 | Analyse the relationship between climate and human health            | An              | PSO2          |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**Name of the

**Course: GEOGRAPHY OF HEALTH AND ENVIRONMENT**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO | PO/ PSO | Cognitive Level | Knowledge Category | Lecture (L) /Tutorial (T) | Practical (P) |
|--------|----|---------|-----------------|--------------------|---------------------------|---------------|
|        |    |         |                 |                    |                           |               |

|   |  |         |       |      |   |  |
|---|--|---------|-------|------|---|--|
| 1 | Understand the key concepts related to health and its driving forces | PSO-1   | U     | F    | L |  |
| 2 | Identify the linkages between the health, environment, exposure      | PSO-1   | U     | F, C | L |  |
| 3 | Evaluate the impact of pollution to human health                     | PSO-2   | E     | C, M | L |  |
| 4 | Acquire knowledge about diseases and their regional pattern          | PSO-1,3 | U, An | M    | L |  |
| 5 | Analyse the relationship between climate and human health            | PSO2    | An    | M    | L |  |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 3 | -     | 3     | -     | -     | -    | 3    | -    | -    | -    | 3    | -    | -    |
| CO 4 | 3     | -     | 3     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 5 | -     | 3     | -     | -     | -    | 3    | -    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Seminar | End Semester Examinations |
|------|---------------|------------|---------|---------------------------|
| CO 1 | ✓             |            | ✓       | ✓                         |
| CO 2 | ✓             |            | ✓       | ✓                         |
| CO 3 | ✓             |            | ✓       | ✓                         |
| CO 4 | ✓             | ✓          | ✓       | ✓                         |
| CO 5 | ✓             | ✓          | ✓       |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK4DSCGGY200</b>   |                  |                   |                    |                  |
| Course Title   | <b>FUNDAMENTALS OF REMOTE SENSING</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>  |                  |                   |                    |                  |
| Semester       | IV  |                  |                   |                    |                  |
| Academic Level | 200 - 299   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites | UK3DSCGGY200/UK3DSCGGY201/UK3DSCGGY202  |                  |                   |                    |                  |
| Course Summary | This Course intends to create fundamental knowledge on interaction between Earth Surface features and EMR, Types of satellites and advantages of remote sensing technology as a tool for monitoring geographic phenomena to solve real world problems |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content  | Hrs      |
|------------|--|--|----------|
| <b>I</b>   | <b>Introduction to Remote Sensing</b>                  |  | <b>9</b> |
|            | 1  | Remote sensing: History & development- Components of Remote Sensing                                    |          |
|            | 2  | Energy Sources, Radiation principles, EMR Wave and particle model                                      |          |
|            | 3  | Electromagnetic Spectrum, Atmospheric Windows, Atmospheric Blinds                                      |          |
|            | 4  | Active and Passive Remote Sensing: Energy Sources, Types   |          |
|            | 5  | Aerial Remote Sensing: Advantages and Limitations-Stereopair   |          |
| <b>II</b>  | <b>Emr Interactions with Atmosphere, Earth Surface</b> |  | <b>9</b> |
|            | 6  | Interaction of EMR with atmosphere: Scattering, Absorption, Refraction                                 |          |
|            | 7  | Interaction of EMR with Earth's surface: Reflectance, Transmission                                     |          |
|            | 8  | Spectral Reflectance: Spectral signature profiles of Vegetation, Soil and Water.                       |          |
| <b>III</b> | <b>Platforms and Satellite Types</b>                   |  | <b>9</b> |
|            | 9  | Remote Sensing Platforms: Types and their Characteristics  |          |
|            | 10   | Types of Satellites: Geo-synchronous and Sun-synchronous   |          |
|            | 11   | Meteorological and communication satellites: INSAT, NOAA, GOES   |          |
|            |  | Earth Resources Satellites: LANDSAT 8 & 9, SPOT 6 & 7, IRS Cartosat, Resourcesat and Sentinel Missions |          |
|            | 12   | Private or Commercial Satellites: GeoEye, Worldview, Pleiades Neo                                      |          |
| <b>IV</b>  | <b>Concept of Resolution</b>                           |  | <b>9</b> |
|            | 13   | Concept of resolution: Spatial, Spectral, Temporal and Radiometric                                     |          |

|          |                                       |   |          |
|----------|---------------------------------------|---|----------|
|          |                                       | resolution  |          |
|          | 14                                    | Multispectral and Hyperspectral Remote Sensing: Characteristics   |          |
|          | 15                                    | Classification of Imaging and Non-Imaging Sensors   |          |
|          | 16                                    | Types of Scanning: Across track and Along track Scanning  |          |
| <b>V</b> | <b>Data Products and Applications</b> |   | <b>9</b> |
|          | 17                                    | Remote Sensing Data: Analog and Digital Data -Path and Row-Metadata-Spectral Bands-False Colour Composite   |          |
|          | 18                                    | Ground truth collection: Use of Radiometers and Spectrophotometers  |          |
|          | 19                                    | Applications of Remote Sensing in Land Use, Disaster Management, Urban Planning, Hydrology, Geology, Environment Assessment, Wildlife studies and Archaeology |          |

## **PRACTICAL**

**(30 Hours)**

**Exercise 1:** Downloading Satellite Imageries from Online Sources: USGS Earth Explorer, NASA Earth Observation, BHUVAN, Copernicus Open Access Hub

**Exercise 2:** Visual Interpretation of IRS Imagery

**Exercise 3:** Stacking Satellite image bands and Creating False Colour Composites using Open-Source Software

**Exercise 4:** Field Survey: Ground truth collection of Spectral Signature of features

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- [https://www.isro.gov.in/INSAT-3DS\\_imaging\\_Earth.html](https://www.isro.gov.in/INSAT-3DS_imaging_Earth.html)
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- [https://www.isro.gov.in/Indian\\_Remote\\_Sensing\\_Satellite\\_1A.html](https://www.isro.gov.in/Indian_Remote_Sensing_Satellite_1A.html)

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- <https://worldview.earthdata.nasa.gov/>
- <https://earth.esa.int/eogateway/missions/pleiades-neo>

**Course Outcomes**

| No.  | Upon completion of the course the graduate will be able to  | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understands various phases of the Remote Sensing process and developing theoretical knowledge on Active, Passive, aerial and satellite remote sensing | R,U             | PSO 1         |
| CO-2 | Recalls interactions of EMR with earth's surface and understanding Spectral response patterns of objects  | R, U            | PSO 1         |
| CO-3 | Classifies Remote Sensing Platforms and Satellites  | An              | PSO 1         |
| CO-4 | Appraise characteristics of various satellite sensors   | E               | PSO 2         |
| CO-5 | Identifies sources of remote sensing data products<br>Examine the applications of RS in various fields  | U, An           | PSO 3         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the course: FUNDAMENTALS OF REMOTE SENSING**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/ PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understands various phases of the Remote Sensing process and developing theoretical knowledge on Active, Passive, aerial and satellite remote sensing | PSO 1   | R, U            | F, C               | L                        | -             |
| 2      | Recalls interactions of EMR with earth's surface and understanding Spectral response patterns of objects  | PSO 1   | R, U            | F, C               | L                        | -             |
| 3      | Classifies Remote Sensing Platforms and Satellites  | PSO 1   | An              | C                  | L                        | P             |
| 4      | Appraise characteristics of various satellite sensors   | PSO 2   | E               | P                  | L                        | -             |
| 5      | Identifies sources of remote  | PSO     | U, An           | M                  | L                        | P             |

|  |  |   |  |  |  |  |
|--|--|---|--|--|--|--|
|  | sensing data products<br>Examine the applications of<br>RS in various fields | 3 |  |  |  |  |
|--|--|---|--|--|--|--|

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO<br>1 | PSO<br>2 | PSO<br>3 | PSO<br>4 | PO<br>1 | PO<br>2 | PO<br>3 | PO<br>4 | PO<br>5 | PO<br>6 | PO<br>7 | PO<br>8 |
|------|----------|----------|----------|----------|---------|---------|---------|---------|---------|---------|---------|---------|
| CO 1 | 3        | -        | -        | -        | 3       | -       | -       | -       | -       | -       | -       | -       |
| CO 2 | 3        | -        | -        | -        | 3       | -       | -       | -       | -       | -       | -       | -       |
| CO 3 | 3        | -        | -        | -        | 3       | -       | -       | -       | -       | -       | -       | -       |
| CO 4 | -        | 3        | 1        | -        | -       | 3       | -       | -       | -       | -       | -       | -       |
| CO 5 | -        | -        | 3        | -        | -       | -       | -       | -       | -       | 2       | 2       | -       |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion / Seminar | End Semester Examinations |
|------|---------------|------------|----------------------|---------------------------|
| CO 1 | ✓             | ✓          |                      | ✓                         |
| CO 2 | ✓             |            | ✓                    | ✓                         |
| CO 3 | ✓             |            |                      | ✓                         |
| CO 4 | ✓             |            |                      | ✓                         |
| CO 5 | ✓             | ✓          | ✓                    |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK4DSCGGY201</b>  |                  |                   |                    |                  |
| Course Title   | <b>GEOGRAPHIC INFORMATION SYSTEM</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | IV   |                  |                   |                    |                  |
| Academic Level | 200-299  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3                |                   | 2                  | 5                |
| Pre-requisites | UK3DSCGGY200/UK3DSCGGY201/UK3DSCGGY202   |                  |                   |                    |                  |
| Course Summary | The course focuses on Geographical Information Systems, a vast array of functionalities from spatial data analysis, data integration and the trends and application of GIS |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                     | Content   | Hrs      |
|------------|--|---|----------|
| <b>I</b>   | <b>Fundamentals of GIS</b>               |   | <b>9</b> |
|            | 1  | Geographic Information System-Definition, History and Components  |          |
|            | 2  | Spatial data and Non spatial data-Attribute data-Sources of data  |          |
|            | 3  | Data models in GIS : Raster and Vector data models- Spatial data Structures : Advantages and disadvantages                      |          |
| <b>II</b>  | <b>Data input in GIS</b>                 |   | <b>9</b> |
|            | 4  | Georeferencing: Types of Georeferencing - Coordinate Reference Systems-Geographic and Projected -UTM Projection                 |          |
|            | 5  | Methods of Data input: Keyboard entry, Scanning, COGO- Digitizing: Manual and Heads Up Digitizing: Advantages and disadvantages |          |
|            | 6  | Data Accuracy : Data Errors in GIS-Source and Processing Errors   |          |
| <b>III</b> | <b>Spatial Data Editing and Analysis</b> |   | <b>9</b> |
|            | 7  | Concept of Topology in GIS: Advantages, Topological Errors  |          |
|            | 8  | Spatial Data Editing: Reprojection, Transformation and Generalization   |          |
|            | 9  | Edge matching and Rubber sheeting, Attribute Data Editing   |          |
| <b>IV</b>  | <b>Recent Trends in GIS</b>              |   | <b>9</b> |
|            | 11                                       | Web GIS and Mobile GIS: Basic Concept and Components  |          |
|            | 12                                       | 3-D GIS, Enterprise GIS- Cloud Computing and GIS- Big data analytics  |          |
|            | 13                                       | Machine Learning-Geospatial AI&AR- Integration of Virtual Reality   |          |
| <b>V</b>   | <b>Applications of GIS</b>               |   | <b>9</b> |
|            | 14                                       | GIS in Environmental Studies, Disaster Management, Urban Planning   |          |
|            | 15                                       | GIS in Business: Market and Demographic Analysis, Transportation and Logistics, Facilities Management and Banking               |          |



## PRACTICALS

(30 Hours)

**Exercise 1:** Field Survey : Ground Truth verification with Toposheets and Georeferencing

**Exercise 2:** Digitizing-Point, Line and Polygon Layers

**Exercise 3:** Symbology-Thematic Mapping

**Exercise 4:** Map composing

**Exercise 5:** Overlay Analysis, Buffering, and Basic Terrain Analysis

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## Course Outcomes

| No   | Upon completion of the Geographic Information System, the graduate will be able to                       | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understands the basic concepts, and components of GIS and recognise various data models used in GIS      | U, R            | PSO 1         |
| CO-2 | Identify methods of data inputs GIS and inspecting source and processing errors of GIS data              | R, An           | PSO 2         |
| CO-3 | Employs various data editing techniques in GIS and analysing spatial data based on location and distance | Ap, An          | PSO 3         |
| CO-4 | Identifying recent concepts and trends in GIS  | U               | PSO 1         |
| CO-5 | Understand the role and application of GIS   | U               | PSO 1         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the course: Geographic Information System**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO   | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|--------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understands the basic concepts, and components of GIS and recognise various data models used in GIS      | PSO 1  | U, R            | F, C               | L                        | -             |
| 2      | Identify methods of data inputs GIS and inspecting source and processing errors of GIS data              | PSO 2  | R, An           | C, P               | L                        | P             |
| 3      | Employs various data editing techniques in GIS and analysing spatial data based on location and distance | PSO 3  | Ap,An           | M                  | L                        | P             |
| 4      | Identifying recent concepts and trends in GIS  | PSO 1  | U               | F, C               | L                        | -             |
| 5      | Understand the role and application of GIS   | PSO 1  | U               | F, C               | L                        | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 2 | -    | 3    | -    | -    | -   | 3   | -   | -   | -   | -   | -   | -   |
| CO 3 | -    | -    | 3    | -    | -   | -   | -   | -   | -   | 3   | 2   | -   |
| CO 4 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 5 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Seminar | End Semester Examinations |
|------|---------------|------------|---------|---------------------------|
| CO 1 | ✓             |            |         | ✓                         |
| CO 2 | ✓             |            |         | ✓                         |
| CO 3 | ✓             |            |         | ✓                         |
| CO 4 |               | ✓          |         | ✓                         |
| CO 5 |               | ✓          | ✓       |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK4DSEGGY200</b>   |                  |                   |                    |                  |
| Course Title   | <b>AERIAL PHOTOGRAPHY AND PHOTOGRAMMETRY</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>  |                  |                   |                    |                  |
| Semester       | IV  |                  |                   |                    |                  |
| Academic Level | 200 - 299   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2                  | 5                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | This course aims to provide fundamental knowledge of Aerial Photographic techniques and photogrammetry. The learner will be able to interpret aerial survey products after completing this course |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content  | Hrs |
|------------|---|--|-----|
| <b>I</b>   | <b>Fundamentals of Aerial Photography</b>   |  | 9   |
|            | 1   | Introduction to aerial photography: History of aerial photography  |     |
|            | 2   | Aerial platforms-Aerial cameras – Types and their characteristics  |     |
|            | 3   | Films: Spectral sensitivity B&W films, Colour film, Colour Infrared films, Filters   |     |
|            | 4   | Flight Planning: Crab & Drift-Computation of flight plan, Planning and execution of photographic flights-Overlaps                        |     |
| <b>II</b>  | <b>Classification of Aerial Photographs</b> |  | 9   |
|            | 5   | Geometry of aerial photographs: Collinearity and Coplanarity   |     |
|            | 6   | Scale of aerial photographs, Focal Length and Flying Height  |     |
|            | 7   | Types of Aerial Photographs: Vertical, Oblique, Trimetrogon  |     |
|            | 8   | Stereoscopes and Stereovision  |     |
| <b>III</b> | <b>Photogrammetric Process</b>              |  | 9   |
|            | 9   | Photogrammetry: Meaning and Definition   |     |
|            | 10  | Development of Photogrammetry: Photogrammetric Process-Orientation & Triangulation   |     |
|            | 11  | Classification of Photogrammetry: Plane table photogrammetry, Analog photogrammetry, Analytical photogrammetry, Digital photogrammetry   |     |
| <b>IV</b>  | <b>Displacement in Aerial Photographs</b>   |  | 9   |
|            | 12  | Relief displacement of Vertical features: Vertical exaggeration and slopes- factor affecting vertical exaggeration and its determination |     |
|            | 13  | Parallax Displacement: Image parallax, Parallax measurement  |     |

|          |   |  |   |
|----------|---|--|---|
| <b>V</b> | <b>Interpretation of Aerial Photographs</b> |  | 9 |
|          | 14  | Elements of Photointerpretation: Keys-Symbols and Colour schemes used in Photointerpretation |   |
|          | 15  | Applications of Aerial photography and Photogrammetry  |   |

## **PRACTICAL**

**(30 Hours)**

**Exercise 1:** Stereovision test and Orientation of aerial photograph

**Exercise 2:** Determination of photo scale

**Exercise 3:** Marginal Information of Aerial Photographs,

**Exercise 4:** Field Survey: Ground Truth verification and Identification of features on Aerial photographs

**Exercise 5:** Visual Interpretation of Aerial Photographs

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- <https://www.spatialpost.com>
- <https://pro.arcgis.com>
- <https://egyankosh.ac.in>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to  | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understanding history and development of aerial Photography | U               | PSO-1         |
| CO-2 | Determining Scale of Aerial Photographs                     | Ap              | PSO-2         |
| CO-3 | Differentiating different methods of Photogrammetry         | An              | PSO-1.        |
| CO-4 | Calculating elevation differences from parallax             | E               | PSO-2         |
| CO-5 | Designing Drone Survey for terrain mapping                  | C               | PSO-2,        |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: AERIAL PHOTOGRAPHY AND PHOTOGRAMMETRY**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|--------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understanding history and development of aerial Photography | PSO-1  | U               | F                  | L                        | -             |
| 2      | Determining Scale of Aerial Photographs                     | PSO-2  | Ap              | M                  | L                        | -             |
| 3      | Differentiating different methods of Photogrammetry         | PSO-3  | An              | M                  | L                        | -             |
| 4      | Calculating elevation differences from parallax             | PSO-2  | E               | M                  | -                        | P             |
| 5      | Designing Drone Survey for terrain mapping                  | PSO-3  | C               | M                  | -                        | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | 3    | -    | -    | -    | -    | -    |
| CO 2 | -     | 3     | -     | -     | -    | 3    | 3    | -    | -    | -    | -    | -    |
| CO 3 | -     | -     | 3     | -     | 3    | -    | 3    | -    | -    | -    | -    | -    |
| CO 4 | -     | 3     | -     | -     | -    | 3    | 3    | -    | -    | -    | -    | -    |
| CO 5 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Project Evaluation | End Semester Examinations |
|------|---------------|------------|--------------------|---------------------------|
| CO 1 | ✓             | ✓          |                    | ✓                         |
| CO 2 | ✓             |            |                    | ✓                         |
| CO 3 | ✓             |            |                    | ✓                         |
| CO 4 | ✓             | ✓          |                    | ✓                         |
| CO 5 |               |            | ✓                  |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK4DSEGGY201</b>  |                  |                   |                    |                  |
| Course Title   | <b>PRINCIPLES OF SURVEYING AND LEVELLING</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | IV   |                  |                   |                    |                  |
| Academic Level | 200 - 299  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | This Course aims to cultivate learner's knowledge of the principles and possibilities of Land Surveying and Levelling. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                  | Content   | Hrs |
|------------|---------------------------------------|---|-----|
| <b>I</b>   | <b>Introduction to Land Surveying</b> |   | 9   |
|            | 1                                     | Land Surveying: Introduction - Principles - Objectives - Uses.  |     |
|            | 2                                     | Units of measurement - Surveying measurement and errors - Types of errors and their corrections - Accuracy and Precision  |     |
|            | 3                                     | Stages of Survey operations - Linear Measurement  |     |
| <b>II</b>  | <b>Bearings and Traverse Survey</b>   |   | 9   |
|            | 4                                     | Measurement of Directions and Angles - Meridians  |     |
|            | 5                                     | Types of Traverses - Procedures - Control establishments  |     |
|            | 6                                     | Bearings: Magnetic, True bearings, Compasses: Prismatic and Surveyor's  |     |
| <b>III</b> | <b>Levelling Surveys</b>              |   | 9   |
|            | 8                                     | Levelling and its application: Concept and Principles of Levelling  |     |
|            | 9                                     | Levelling instruments: Dumpy level, Auto level, Digital level, Laser level  |     |
|            | 10                                    | Principle axes of Dumpy level: Temporary and Permanent adjustments  |     |
|            | 11                                    | Principles of levelling, Reduction of levels, booking of staff reading  |     |
| <b>IV</b>  | <b>Plane Table Surveying</b>          |   | 9   |
|            | 12                                    | Classification of levelling, Differential, Profile, Cross sectioning-Contouring   |     |
|            | 13                                    | Table Surveying: Definition, Principles, Accessories, Adjustments   |     |
|            | 14                                    | Methods of Plane table surveying: Area - Trapezoidal rule, Average ordinate rule, Simpson's 1/3 rule - Coordinate methods |     |
| <b>V</b>   | <b>Theodolite Surveying</b>           |   | 9   |
|            | 15                                    | Planimeter: Types Area of zero circle -Uses of Planimeter.  |     |
|            | 16                                    | Theodolite Traversing: Various parts and axis of transit -Temporary and Permanent adjustments of a transit                |     |
|            | 17                                    | Methods of running a theodolite traverse - Latitudes and departures - Rectangular Coordinates                             |     |
|            | 18                                    | Traverse adjustments by Bowditch's- Transit and modified transit rules  |     |



**PRACTICAL****(30 Hours)****Exercise 1:** Dumpy Level Surveying: Height of Collimation method**Exercise 2:** Dumpy Level Surveying: Rise and Fall method**Exercise 3:** Theodolite Survey**Exercise 4:** Profiling River Cross Sections**Reference:**

- Ghilani, C. D., & Wolf, P. R. (2019). Elementary Surveying: An Introduction to Geomatics. Pearson.
- Davis, Raymond E., Francis S. Foote, and Joe T. Kelly. Surveying: Theory and Practice. McGraw-Hill Education, 2009.
- R. Subramanian, Surveying and Levelling, Oxford University Press, Second Edition, 2012.
- James M. Anderson and Edward M. Mikhail, Surveying, Theory and Practice, Seventh Edition, Mc Graw Hill 2001.
- Bannister and S. Raymond, Surveying, Seventh Edition, Longman 2004.
- S. K. Roy, Fundamentals of Surveying, Second Edition, Prentice^ Hall of India 2010.
- K. R. Arora, Surveying Vol I & II, Standard Book House, Twelfth Edition 2013.
- C. Venkatramaiah, Textbook of Surveying, Universities Press, Second Edition, 2011

**Web References:**

- <https://nlcprep.com/fundamentals-of-surveying>
- <https://natural-resources.canada.ca>
- <http://ecoursesonline.iasri.res.in>
- <https://www.india.oup.com>

**Course Outcomes**

| No.  | Upon completion of the course the graduate will be able to  | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Infer and apply the principles and stages of surveying  | U, Ap           | PSO-1,3       |
| CO-2 | Discuss measurement of directions and angles, meridians and bearings.   | U               | PSO-1         |
| CO-3 | Comprehend and apply levelling and its applications, Types of instruments                                     | U, Ap           | PSO-1,3       |
| CO-4 | Explain and construct various aspects of table surveying, its principles and methods; computation of volumes. | U, Ap           | PSO-3         |
| CO-5 | Understand and apply various aspects of theodolite  | U, Ap           | PSO-1,3       |

|  |   |  |  |
|--|---|--|--|
|  | surveying and methods of running a theodolite survey. |  |  |
|--|---|--|--|

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: PRINCIPLES OF SURVEYING AND LEVELLING**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/PSO   | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|----------|-----------------|--------------------|--------------------------|---------------|
| 1      | Infer and apply the principles and stages of surveying   | PSO -1,3 | U,              | F                  | L                        | -             |
| 2      | Discuss measurement of directions and angles, meridians, and bearings.   | PSO -1   | U               | P                  | L                        | -             |
| 3      | Comprehend and apply levelling and its applications, Types of instruments                                      | PSO -1,3 | U, Ap           | M                  | L                        | -             |
| 4      | Explain and construct various aspects of table surveying, its principles, and methods; computation of volumes. | PSO -3   | U, Ap           | P                  | -                        | P             |
| 5      | Understand and apply various aspects of theodolite surveying and methods of running a theodolite survey.       | PSO -1,3 | U, Ap           | M                  | -                        | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | 3    | -    | 2    | -    | 2   | -   | -   | 3   | -   | 3   | 3   | -   |
| CO 2 | 2    | -    | -    | -    | 3   | -   | -   | 3   | -   | -   | -   | -   |
| CO 3 | 3    | -    | 2    | -    | 2   | -   | -   | 3   | -   | 3   | 3   | -   |
| CO 4 | -    | -    | 3    | -    | -   | -   | -   | -   | -   | 2   | 3   | -   |
| CO 5 | 3    | -    | 2    | -    | 2   |     |     | 3   | -   | 3   | 3   | -   |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Project Evaluation | End Semester Examinations |
|------|---------------|------------|--------------------|---------------------------|
| CO 1 | ✓             | ✓          |                    | ✓                         |
| CO 2 | ✓             |            |                    | ✓                         |
| CO 3 | ✓             |            |                    | ✓                         |
| CO 4 | ✓             | ✓          |                    | ✓                         |
| CO 5 |               |            | ✓                  |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK4DSEGGY202</b>   |                  |                   |                    |                  |
| Course Title   | <b>DISASTER PREPAREDNESS AND PREVENTION AND MITIGATION</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>  |                  |                   |                    |                  |
| Semester       | IV  |                  |                   |                    |                  |
| Academic Level | 200-299   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | This course will develop the skill of understanding about disaster preparedness and to empower individuals and communities to proactively prepare for, effectively respond to, and recover from disasters, thereby minimizing the impact on lives, property, and infrastructure |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content  | Hrs |
|------------|--|--|-----|
| <b>I</b>   | <b>Disaster Preparedness</b>   |  | 9   |
|            | 1  | Disaster Management: Prevention and Preparedness   |     |
|            | 2  | Disaster Preparedness: Concept and Nature, Disaster Preparedness for People and Infrastructure.                          |     |
|            | 3  | Disaster Preparedness Plan: Community-Based Planning   |     |
| <b>II</b>  | <b>Role and Responsibilities of Different Agencies and Governments</b> |  | 9   |
|            | 4  | Role of information, Education, Communication and Training   |     |
|            | 5  | Role and Responsibilities of Central-NDMA, State-SDMA-, District and Local Administration.                               |     |
|            | 6  | Role and Responsibilities of Armed Forces, Police, and Para Military Forces  |     |
|            | 7  | Role and Responsibilities of International Agencies, NGO'S, CBO's  |     |
| <b>III</b> | <b>Disaster Prevention and Mitigation</b>                              |  | 9   |
|            | 8  | Concept and Elements of Disaster Prevention  |     |
|            | 9  | Prevention Strategies: National Policy; Legislation, Public Awareness and Education.                                     |     |
|            | 10   | Problem areas in Prevention; Traditional mindset, costs and benefits, developmental Problems, Other national priorities. |     |
|            |  | Disaster Mitigation: Meaning and Strategies of Mitigation  |     |
| <b>IV</b>  | <b>Stages of Disaster Preparedness Programs</b>                        |  | 9   |
|            | 11   | Disaster Preparedness at the Pre-Disaster Stage; Mitigation, Risk Assessment and Vulnerability analysis,                 |     |
|            | 12   | Disaster Preparedness during Disaster; Search Rescue Evacuation, Shelter for victimize, First Aid.                       |     |

|   |   |  |   |
|---|---|--|---|
|   | 13  | Disaster Preparedness at the Post-Disaster Stage; Damage Assessment, Economic rehabilitation, Social rehabilitation, Women and Children rehabilitation |   |
|   | 14  | Disaster Preparedness with relevance with special needs/vulnerable groups: Preparedness in relevance to Housing, Infrastructure and livestock          |   |
| V | <b>Technologies for disaster Preparedness</b> |  | 9 |
|   | 15  | Role of Information Technology in disaster Preparedness  |   |
|   | 16  | Remote Sensing, GIS and GPS  |   |
|   | 17  | Use and application of Emerging Technologies for Disaster Preparedness; Robots; Drones, Internet of Things, Artificial Intelligence                    |   |

## PRACTICAL

(30 Hours)

**Exercise 1 :** Prepare Community Action Plan for Disaster Mitigation OR Visit to Disaster affected areas and prepare a report

## References

- Nasios, A.S. 1990. Disaster Mitigation and Economic Incentives in Colloquium on the Environment and Natural Disaster Management. Washington, D.C.: The World Bank.
- Nojri, E. 2005 Public Health Issues in Disasters. Crit Care Med. 33: 529-533.
- Organisation of American States. 1984. Integrated Regional Development: Guidelines and Case Studies from OAS Experience. Washington, D.C.: The World Bank.
- Smith, K. 1992. Environmental Hazards: Assessing Risk and Reducing Disaster. London: Routledge. 5. Taori, K. 2005. Disaster Management through Panchayati. New Delhi: Concept Publishing Comapany.
- United Nations Disaster Relief Organization. 1978. Disaster Prevention and Mitigation: A Compendium of Current Knowledge. New York: United Nations.
- United Nations, Office of the Disaster Relief Coordinator. 1988. Disaster Mitigation: A Manual for Planners, Policy Makers, and Communities. Geneva: United Nations Press.

## Web References

- <https://ors.od.nih.gov/ser/dem/emergencyPrep/Pages/Disaster-Preparedness-Tips.aspx#:~:text=Prepare%20to%20be%20self%2Dsufficient,seasonal%20clothing%2C%20and%20sanitation%20supplies.>
- <https://www.civilinfohub.in/2023/03/disaster-management-functions-of.html#:~:text=Responsibilities%20of%20DDMA&text=Ensure%20that%20the%20guidelines%20for,local%20authorities%20in%20the%20district.>
- <https://magazines.odisha.gov.in/Orissareview/jan2004/englishpdf/chapter15.pdf>
- <https://www.ddmakangra.org/public/library/Prevention%20and%20Mitigation.pdf>
- [https://training.fema.gov/emiweb/downloads/is111\\_unit%204.pdf](https://training.fema.gov/emiweb/downloads/is111_unit%204.pdf)

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to   | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understanding basic concepts of disaster preparedness  | U               | PSO-1,2       |
| CO-2 | Identify Role and Responsibilities of Different Agencies and Governments for disaster preparedness | U               | PSO-1,2       |
| CO-3 | Analyse various Disaster Prevention policies and problems  | An              | PSO-3         |
| CO-4 | Identify different stages of disaster preparedness   | U               | PSO- 2        |
| CO-5 | Apply emerging Technologies for disaster Preparedness  | Ap              | PSO-3         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: DISASTER PREPAREDNESS AND PREVENTION AND MITIGATION**

**Credits: 4:0:0 (Lecture:Tutorial: Practical)**

| CO No. | CO   | PO/PSO   | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|----------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understanding basic concepts of disaster preparedness  | PSO-1, 2 | U               | F, C               | L                        | -             |
| 2      | Identify Role and Responsibilities of Different Agencies and Governments for disaster preparedness | PSO-1, 2 | U               | F                  | L                        | -             |
| 3      | Analyse various Disaster Prevention policies and problems  | PSO-3    | An              | M                  | L                        | -             |
| 4      | Identify different stages of disaster preparedness   | PSO- 2   | U               | F,C                | L                        | -             |
| 5      | Apply emerging Technologies for disaster Preparedness  | PSO-3    | Ap              | P                  | L                        | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|      | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
|------|------|------|------|------|-----|-----|-----|-----|-----|-----|
| CO 1 | 1    | 3    | -    | -    | 3   | -   | -   | 3   | -   | -   |
| CO 2 | 2    | 3    | -    | -    | 3   | -   | -   | 3   | -   | -   |
| CO 3 | -    | -    | 2    | -    | -   | -   | -   | 2   | -   | 3   |
| CO 4 | -    | 3    | 2    | -    | -   | 3   | 2   | -   | -   | -   |
| CO 5 | -    | 1    | 2    | -    | -   | -   | -   | -   | 2   | -   |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Project Evaluation | End Semester Examinations |
|------|---------------|------------|--------------------|---------------------------|
| CO 1 | ✓             |            |                    | ✓                         |
| CO 2 |               | ✓          |                    | ✓                         |
| CO 3 | ✓             |            |                    | ✓                         |
| CO 4 | ✓             |            |                    | ✓                         |
| CO 5 |               |            | ✓                  | ✓                         |



## University of Kerala

|                |   |                     |                      |                       |                     |
|----------------|---|---------------------|----------------------|-----------------------|---------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                     |                      |                       |                     |
| Course Code    | <b>UK4DSEGGY203</b>   |                     |                      |                       |                     |
| Course Title   | <b>SETTLEMENT GEOGRAPHY</b>   |                     |                      |                       |                     |
| Type of Course | <b>DSE</b>  |                     |                      |                       |                     |
| Semester       | IV  |                     |                      |                       |                     |
| Academic Level | 200-299   |                     |                      |                       |                     |
| Course Details | Credit  | Lecture<br>per week | Tutorial<br>per week | Practical<br>per week | Total<br>Hours/Week |
|                | 4   | 3 hours             | -                    | 2                     | 5                   |
| Pre-requisites |   |                     |                      |                       |                     |
| Course Summary | The course focuses on the basic concepts of settlements, settlement types and its characteristics, urban problems, and planning in urban and rural areas. |                     |                      |                       |                     |

### Detailed Syllabus:

| Module     | Unit  | Content  | Hrs |
|------------|---|--|-----|
| <b>I</b>   | <b>Nature and Scope</b>   |  | 10  |
|            | 1   | Settlement geography: definitions, nature and scope  |     |
|            | 2   | Development of Settlement of Geography   |     |
|            | 3   | Settlement types, their characteristics and differences - Factors influencing growth and distribution of settlements |     |
|            | 4   | Approaches to the study of Settlement Geography - Genetic, Spatial and Ecological                                    |     |
| <b>II</b>  | <b>Rural Settlement – Type and Pattern</b>  |  | 9   |
|            | 5   | Rural settlements – evolution - Site and situation   |     |
|            | 6   | Classification of rural settlements on the basis of: population and patterns -spacing and functions.                 |     |
|            | 7   | Distribution and density of rural settlements in India - Structure of house and building materials in India          |     |
|            | 8   | Regional variations in rural settlement patterns in India -Morphology of rural settlement in India                   |     |
| <b>III</b> | <b>Urban Settlements - Classification</b>   |  | 10  |
|            | 9   | Origin and growth of urban settlements   |     |
|            | 10  | Classification of urban settlements on the basis of functions  |     |
|            | 11  | Hierarchy of urban Settlement: rank size rule and primate city   |     |
|            | 12  | Concept: urban place, urban agglomeration, urban sprawl  |     |
|            | 13  | Urban-rural fringe: Concept and Characteristics  |     |
|            | 14  | Rank-size rule   |     |
|            | 15  | Central Business District (CBD): Concept and Characteristics   |     |
| 16         | Urbanisation in India: Trends and patterns - Morphology of urban settlements in India |  |     |



|           |   |  |   |
|-----------|---|--|---|
| <b>IV</b> | <b>Urban Problems – Slums and Shatter Settlements</b> |  | 7 |
|           | 17  | Urban issues and challenges -socio-cultural, economic, environmental - possible solutions                        |   |
|           | 18  | Urban Slums and shatter settlements  |   |
|           | 19  | Urban problems in Indian cities  |   |
|           | 20  | Smart city: Concept, need and implementation in India  |   |
| <b>V</b>  | <b>Urban and Rural Planning</b>                       |  | 9 |
|           | 21  | Urban planning experiments and visions of smart city / edge city / SEZ / EPZ                                     |   |
|           | 22  | Major Indian urban development schemes –NUTP,NUSP, NERUDP,PFDF,NUIS,HRIDAY, Housing for all by 2022              |   |
|           | 23  | Rural planning- Major Indian rural development schemes – SGRY, Rural Housing, PMGSY,DDU-GKY,NREGA,EAS,DPAP,NRDWP |   |

## PRACTICALS

(30 Hours)

**Exercise 1:** Field Survey : Comparitive study of infrastructural facilities of a rural and urban area

## References

- Ghosh. S. (2015): “Introduction to Settlement Geography”, Orient Blackswan Private Limited, Hyderabad
- JyptirmoySen (2007): A Text Book of Social and Cultural Geography,” KalyaniPublsiher, New Delhi.
- Daniel, P.A. and Hopkinson, M.F. (1989) The Geography of Settlement, Oliver & Boyd London
- Bhende, A. and Kanitkar, T. (2011): Principles of Population Studies, Himalaya Publishing House, Bombay.
- Beaujeu, G. J. (1966): Geography of Population, Longman Group Ltd.
- Chandna, R.C. (Rep.2010): Geography of Population, Concepts, Determinants and Patterns, Kalyani Publishers, New Delhi.
- Clark, J. I. (1973): Population Geography, Pergamon Press Ltd., Oxford.
- Clark, J.I. (1984): Geography and Population: Approaches and Applications, Pergamon Press Ltd., Oxford.
- Hudson, (1970): Geography of Settlement, Macdonald & Evans Ltd., London.
- Khullar, D. R. (2011): India A Comprehensive Geography, Kalyani Publication, New Delhi.
- Michel Chisholm (1973): Studies in Human Geography, London.
- Mishra, R.S. (1975): Economics of Growth and Development, Somaiya Publication Pvt. Ltd.
- Singh R.Y. (Rep. 2010): Geography of Settlements, Rawat Publication.
- MusmadeArjun, SonawaneAmit and Jyotiram More, (2015): Population & Settlement Geography, Diamond Publication Pune.

## Web References

- <https://smartcities.gov.in/about-the-mission>
- <https://ncert.nic.in/ncerts/l/legy204.pdf>
- <https://education.nationalgeographic.org/resource/urban-area/>

➤ <https://www.worldbank.org/en/news/feature/2011/07/04/indias-urban-challenges>

**Course Outcomes**

| No.  | Upon completion of the course the graduate will be able to                                     | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the basic concepts in settlement Geography  | U               | PSO-1         |
| CO-2 | Understand the basic concepts of rural settlements and evaluate the rural settlements in India | U,E             | PSO-1,2       |
| CO-3 | Understand the basic concepts of urban settlements and evaluate the urban settlements in India | U,E             | PSO-1,2       |
| CO-4 | Analysis on urban problems   | An              | PSO-1,2       |
| CO-5 | Analysis on urban and rural planning process   | An              | PSO-1,2       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: SETTLEMENT GEOGRAPHY**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the basic concepts in settlement Geography  | PSO-1   | U               | F,C                | L                        | -             |
| 2      | Understand the basic concepts of rural settlements and evaluate the rural settlements in India | PSO-1,2 | U,E             | F,C                | L                        | -             |
| 3      | Understand the basic concepts of urban settlements and evaluate the urban settlements in India | PSO-1,2 | U,E             | F,C                | L                        | P             |
| 4      | Analysis on urban problems   | PSO-1,2 | An              | M                  | L                        | -             |

|   |  |         |    |     |   |   |
|---|--|---------|----|-----|---|---|
| 5 | Analysis on urban and rural planning process | PSO-1,2 | An | F,M | L | P |
|---|--|---------|----|-----|---|---|

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|             | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|-------------|------|------|------|------|-----|------|------|------|------|------|------|------|
| <b>CO 1</b> | 3    | -    | -    | -    | 3   | -    | -    | -    | -    | -    | -    | -    |
| <b>CO 2</b> | 3    | 2    | -    | -    | 3   | -    | -    | -    | -    | -    | -    | -    |
| <b>CO 3</b> | 3    | 2    | -    | -    | 3   | -    | -    | -    | -    | -    | -    | -    |
| <b>CO 4</b> | 2    | 2    | -    | -    | 3   | 2-   | -    | -    | -    | -    | -    | -    |
| <b>CO 5</b> | 2    | 2    | -    | -    | 3   | 1    | -    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             |            | ✓          | ✓                         |
| CO 3 | ✓             |            | ✓          | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             |            |            |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK4VACGGY200</b>   |                  |                   |                    |                  |
| Course Title   | <b>ENVIRONMENTAL ETHICS</b>   |                  |                   |                    |                  |
| Type of Course | <b>VAC</b>  |                  |                   |                    |                  |
| Semester       | IV  |                  |                   |                    |                  |
| Academic Level | 200 - 299   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 3   | 3 hours          | -                 | -                  | 3                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | Environmental ethics explores the moral and philosophical dimensions of humanity relationship with the environment. This course delves into ethical theories and principle they apply to environmental issues such as sustainability, conservation, biodiversity and environmental justice. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content  | Hrs      |
|------------|---|--|----------|
| <b>I</b>   | <b>Geography and Environment</b>                    |  | <b>9</b> |
|            | 1   | Traditions in Geography : Earth Science-man environment relationship-area studies-spatial analysis   |          |
|            | 2   | Components of Environment: Biotic-Abiotic  |          |
|            | 3   | Types of Environment-Geographic-Man made-Significance  |          |
| <b>II</b>  | <b>Man-Environment relationship</b>                 |  | <b>9</b> |
|            | 4   | Concept of Environmental Determinism-Possibilism-Neo-Determinism   |          |
|            | 5   | Human modification of the environment : Human induced environmental issues : Pollution- ClimateChange-Impacts of Green Revolution-Mining-Urbanization-Industrial Development |          |
| <b>III</b> | <b>Concept of Environmental Ethics</b>              |  | <b>9</b> |
|            | 6   | Nature and scope of Environmental Ethics : Concepts and Issues   |          |
|            |   | Ecology- Types of Ecology-Landscape Ecology-Ecosystem Ecology-Community Ecology-Population Ecology- Organismal Ecology-Ecological niche                                      |          |
|            | 7   | Libertarian Extension, the Ecologic Extension, and Conservation Ethics   |          |
|            | 8   | Anthropocentrism vs Ecocentrism-Ecofeminism-Political Ecology-Social Ecology   |          |
|            | 9   | Deep Ecology : Meaning and Definition-Principles-Criticism   |          |
| <b>IV</b>  | <b>Environmentalism : Conservation and Activism</b> |  | <b>9</b> |
|            | 10  | Environmental Conservation : Principles and Methods<br>Environment-Development Debate –Environmental Movements in India-   |          |
|            | 11  | Environmental Quality : Measurement and Standards  |          |
| <b>V</b>   | <b>Environmental Sustainability</b>                 |  | <b>9</b> |
|            | 12  | Environmental Management and Planning-Concept of Sustainable Development.  |          |

## Reference

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- Grim, J. A. (2001). Indigenous Traditions and Ecology (Ed.), Harvard University Press.
- Sivaramakrishnan, K. (2015). 'Ethics of Nature in Indian Environmental History', Modern Asian Studies, Vol.49, No.4. pp. 1261-1310.
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- Vandever, D.C.P. and Vandever, D. (2002). The Environmental Ethics and policy book: Philosophy, Ecology, Economics (3Ed.), Wadsworth publishing, California.

## Web references

- <https://ebooks.inflibnet.ac.in/geop08/chapter/chapter-1/>
- <https://www.onlinebiologynotes.com/environment-and-its-components/>
- <https://www.cambridge.org/core/journals/environmental-conservation>
- <https://egyankosh.ac.in/bitstream/123456789/74464/3/Unit-12.pdf>

## Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                         | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Acquire knowledge about Environmental Ethics                                       | R,U             | PSO-1         |
| CO-2 | Understand the Environmental theories from various Western and Indian philosophers | U               | PSO-1         |
| CO-3 | Analyse the contextual relevance of Environmental Ethics                           | An              | PSO-1         |
| CO-4 | Evaluate the impact of environmental movements, conservation effects and efforts.  | E               | PSO-1,2       |
| CO-5 | Identify Sustainable Environmental Management Plans.                               | U,C             | PSO-1,3       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: ENVIRONMENTAL ETHICS**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial | Practical (P) |
|--------|----|--------|-----------------|--------------------|----------------------|---------------|
|        |    |        |                 |                    |                      |               |

|   |  |         |     |      |     |  |
|---|--|---------|-----|------|-----|--|
|   |  |         |     |      | (T) |  |
| 1 | Acquire knowledge about Environmental Ethics                                       | PSO-1   | R,U | F    | L   |  |
| 2 | Understand the Environmental theories from various Western and Indian philosophers | PSO-1   | U   | F, C | L   |  |
| 3 | Analyse the contextual relevance of Environmental Ethics                           | PSO-1   | An  | C, M | L   |  |
| 4 | Evaluate the impact of environmental movements, conservation effects and efforts.  | PSO-1,2 | E   | M    | L   |  |
| 5 | Identify Sustainable Environmental Management Plans.                               | PSO-1,3 | U,C | M    | L   |  |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|------|-------|-------|-------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | 3     | -     | -     | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 2 | 3     | -     | -     | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 3 | 3     | -     | -     | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 4 | 3     | 3     | -     | -    | 3   | 3   | -   |     | -   | -   | -   | -   |
| CO 5 | 3     | -     | -     | -    | 3   | -   | 1   | -   | -   | -   | -   | -   |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            | ✓          | ✓                         |
| CO 3 | ✓             |            | ✓          | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             | ✓          |            |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK4VACGGY201</b>   |                  |                   |                    |                  |
| Course Title   | <b>WATER RESOURCE MANAGEMENT</b>  |                  |                   |                    |                  |
| Type of Course | <b>VAC</b>  |                  |                   |                    |                  |
| Semester       | IV  |                  |                   |                    |                  |
| Academic Level | 200-299   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 3   | 3 hours          | -                 |                    | 3                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | The course on Water Resources Management typically covers a broad range of topics related to the importance of water resource, principles of hydrological cycle, integrated water resource management, sustainable and efficient use of water and analysis of water laws, regulations and governance structure. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                     | Content   | Hrs      |
|------------|--|---|----------|
| <b>I</b>   | <b>Introduction Of Water Resource</b>    |   | <b>9</b> |
|            | 1  | Meaning and scope of water resource management  |          |
|            | 2  | Historical profile on world Water Resources Development   |          |
|            | 3  | Hydrological cycle- Evapotranspiration, Precipitation, Interception, Infiltration, Run off, Storage |          |
| <b>II</b>  | <b>Surface water Resource</b>            |   | <b>9</b> |
|            | 4  | Distribution of surface water-Types and Significance,   |          |
|            | 5  | Watershed as Geohydrological unit, Drainage Basin, Catchment area                                   |          |
|            | 6  | Surface water pollution and environment   |          |
| <b>III</b> | <b>Ground Water Resource</b>             |   | <b>9</b> |
|            | 7  | Ground water-rock properties affecting ground water-porosity, permeability                          |          |
|            | 8  | Zone of aeration and ground water   |          |
|            | 9  | Water Table-saturated and unsaturated zone  |          |
|            | 10                                       | Aquifers-Characteristics-Classification   |          |
|            | 11                                       | Ground water depletion and environment  |          |
| <b>IV</b>  | <b>Water Conservation and Management</b> |   | <b>9</b> |
|            | 12                                       | Water conservation  |          |
|            | 13                                       | Traditional water harvesting methods, Rainwater harvesting and management                           |          |
|            | 14                                       | Forest management and water conservation  |          |
|            | 15                                       | Wetland and micro watershed management  |          |
|            | 16                                       | Integrated watershed management   |          |



| V | Water Governance And Policies |  | 9 |
|---|-------------------------------|--|---|
|   | 17                            | Concept of sustainable use of water resource |   |
|   | 18                            | Water and climatic change                    |   |
|   | 19                            | water policy of India                        |   |

### References

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- Tim, Davie. (2009), Fundamentals of Hydrology (3rd Edition), Routledge.
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- Rao, K.L., 1982: India's Water Wealth 2nd edition, Orient Longman, Del
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- <https://www.iaea.org/topics/groundwater>
- <https://www.un-igrac.org/what-groundwater>
- <https://www.watercache.com/education/rainwater-harvesting-101>
- [https://jsactr.mowr.gov.in/Public\\_Dash/download/Rain\\_Water\\_Harvesting\\_Conservation\\_Manual\\_2019-CPWD](https://jsactr.mowr.gov.in/Public_Dash/download/Rain_Water_Harvesting_Conservation_Manual_2019-CPWD)

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to  | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Able to remember various components of hydrological cycles and will understand the concept water resource management                            | R               | PSO-1         |
| CO-2 | Understand various water quality issues and able to identify sources of pollution and assess the impact of water pollution on ecosystem         | U               | PSO-1         |
| CO-3 | Develop knowledge of aquifer characteristics as well as the ability to assess ground water quality and identify potential contamination sources | U, E            | PSO-1,3       |
| CO-4 | Evaluate the sustainable water management strategies, including water conservation and integrated water resource management                     | E               | PSO-1         |

|      |   |    |         |
|------|---|----|---------|
| CO-5 | Comprehend the principles of water governance and understand international water law and policy framework. They will analyse the role of water management and decision-making process | An | PSO-1,3 |
|------|---|----|---------|

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: WATER RESOURCE MANAGEMENT**

**Credits: 3 (Lecture: Practical: Tutorial)**

| CO No. | CO  | PO/ PSO  | Cognitive Level | Knowledge Category | Lecture (L) /Tutorial (T) | Practical (P) |
|--------|---|----------|-----------------|--------------------|---------------------------|---------------|
| 1      | Able to remember various components of hydrological cycles and will understand the concept water resource management  | PSO -1   | R               | F                  | L                         |               |
| 2      | Understand various water quality issues and able to identify sources of pollution and assess the impact of water pollution on ecosystem   | PSO -1   | U               | F, C               | L                         |               |
| 3      | Develop knowledge of aquifer characteristics as well as the ability to assess ground water quality and identify potential contamination sources                                       | PSO -1,3 | U, E            | C, M               | L                         |               |
| 4      | Evaluate the sustainable water management strategies, including water conservation and integrated water resource management   | PSO -1   | E               | P, C               | L                         |               |
| 5      | Comprehend the principles of water governance and understand international water law and policy framework. They will analyse the role of water management and decision-making process | PSO -1,3 | An              | M                  | L                         |               |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|             | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|-------------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>CO 1</b> | 3    | -    | -    | -    | -   | 3   | -   | -   | -   | -   | -   | -   |
| <b>CO 2</b> | 3    | 3    | -    | -    | -   | 3   | -   | -   | -   | -   | -   | -   |
| <b>CO 3</b> | 3    | -    | 2    | -    | -   | 3   | 2   | -   | -   | -   | -   | -   |
| <b>CO 4</b> | 2    | -    | -    | -    | -   | 2   | -   | -   | -   | -   | -   | -   |
| <b>CO 5</b> | 1    | -    | 2    | -    | -   | 1   | 1   | -   | -   | -   | -   | -   |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            | ✓          | ✓                         |
| CO 3 | ✓             |            | ✓          | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             | ✓          |            |                           |



## University of Kerala

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK4SECGGY200</b>   |                  |                   |                    |                  |
| Course Title   | <b>INTRODUCTION TO MAPS</b>   |                  |                   |                    |                  |
| Type of Course | <b>SEC</b>  |                  |                   |                    |                  |
| Semester       | IV  |                  |                   |                    |                  |
| Academic Level | 200-299   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 3   | 3 hours          | -                 | -                  | 3                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | It covers the types of maps, their advantages, and toposheet interpretation |                  |                   |                    |                  |

### Detailed Syllabus:

| Module     | Unit                                | Content  | Hrs |
|------------|-------------------------------------|--|-----|
| <b>I</b>   | <b>Introduction to Maps</b>         |  | 6   |
|            | 1                                   | History of maps – Types of maps – Classification of maps based on scale and purpose; uses of maps; Advantages of maps over globes  |     |
| <b>II</b>  | <b>Thematic Maps</b>                |  | 6   |
|            | 2                                   | Thematic maps – Simple & Complex Thematic Maps – Qualitative and Quantitative thematic maps; Problems in thematic mapping  |     |
|            | 3                                   | Atlas Mapping- Mapping Socio-economic data   |     |
| <b>III</b> | <b>Special Purpose Maps</b>         |  | 6   |
|            | 4                                   | Special Purpose maps – Maps for children, Neo literates, Tourists, Blind and maps for business and commercial organisations.   |     |
| <b>IV</b>  | <b>Mapping the Terrain</b>          |  | 6   |
|            | 5                                   | Mapping the terrain – Methods of representation – spot heights, Layer shading, contouring field sketching – Block diagrams – perspective block diagram; Mapping the climatic & socio-economic data |     |
| <b>V</b>   | <b>Interpretation of Toposheets</b> |  | 6   |
|            | 6                                   | Reading toposheet – Marginal information – Relief – Drainage – Mode of transport – Settlement pattern – climate – vegetation – Occupation  |     |

### PRACTICAL

**(15 hours)**

**Exercise 1:** Survey of India toposheets – Grid references in toposheets – Illustration of Conventional signs and symbols

### Reference

- Misra R P & Ramesh A (1989) Fundamentals of Cartography, Concept Publishing Company
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- Khullar DR (2019) Essentials of Practical Geography
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- <https://education.nationalgeographic.org/resource/map/>
- [https://www.nios.ac.in/media/documents/316courseE/316\\_LabM\\_E-3.pdf](https://www.nios.ac.in/media/documents/316courseE/316_LabM_E-3.pdf)
- <https://practicalgeoskills.blogspot.com/2018/04/methods-of-representing-relief-of.html>
- <https://www.icsm.gov.au/education/fundamentals-mapping/types-maps>
- <https://www.icsm.gov.au/education/fundamentals-mapping/history-mapping>

### Course Outcomes

| No.   | Upon completion of the course the graduate will be able to | Cognitive Level | PSO addressed |
|-------|--|-----------------|---------------|
| CO-1  | Understand the types of maps                               | U               | PSO 1         |
| CO-2  | Create Atlas   | C               | PSO 1,3       |
| CO- 3 | Analyse and evaluate the need for special-purpose maps     | An, E           | PSO 1,2       |
| CO- 4 | Create maps using various socioeconomic data               | Ap              | PSO 3         |
| CO -5 | Apply knowledge of interpreting toposheets                 | C               | PSO 2         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the course: INTRODUCTION TO MAPS**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO                           | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L) /Tutorial(T) | Practical (P) |
|--------|------------------------------|--------|-----------------|--------------------|--------------------------|---------------|
| CO-1   | Understand the types of maps | PSO 1  | U               | C                  | L                        | -             |
| CO-2   | Create Atlas                 | PSO 3  | C               | P                  | L                        | P             |
| CO-3   | Analyse and evaluate         | PSO 2  | An, E           | P                  | L                        | -             |

|      |  |       |    |   |   |   |
|------|--|-------|----|---|---|---|
|      | the need for special-purpose maps            |       |    |   |   |   |
| CO-4 | Create maps using various socioeconomic data | PSO 3 | Ap | M | L | P |
| CO-5 | Apply knowledge of interpreting toposheets   | PSO 2 | C  | M | L | - |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | -     | 3     | -     | 3    | -    | -    | -    | -    | 3    | -    | -    |
| CO 3 | 3     | 3     | -     | -     | 3    | 3    | 3    | -    | -    | -    | -    | -    |
| CO 4 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | -    | -    |
| CO 5 | -     | 3     | -     |       | -    | 3    | 3    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion / Seminar | End Semester Examinations |
|------|---------------|------------|----------------------|---------------------------|
| CO 1 | ✓             |            | ✓                    | ✓                         |
| CO 2 | ✓             | ✓          |                      | ✓                         |
| CO 3 | ✓             |            |                      | ✓                         |
| CO 4 | ✓             | ✓          |                      | ✓                         |
| CO 5 | ✓             | ✓          |                      |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK5DSCGGY300</b>   |                  |                   |                    |                  |
| Course Title   | <b>GEOGRAPHY OF INDIA</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>  |                  |                   |                    |                  |
| Semester       | V   |                  |                   |                    |                  |
| Academic Level | 300-399   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3                |                   | 2                  | 5                |
| Pre-requisites | UK4DSCGGY200/UK4DSCGGY201   |                  |                   |                    |                  |
| Course Summary | The course covers the various aspects of physical and cultural features of India. It also focuses on the practical activities comprises representation of relief features by contours, conventional signs and symbols and interpretation of Survey of India toposheets. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                     | Content   | Hrs |
|------------|--|---|-----|
| <b>I</b>   | <b>Physiography and Drainage Systems</b> |   | 9   |
|            | 1  | Location - Geopolitical Significance - Time zone  |     |
|            | 2  | Physiographic Divisions- Northern Mountains, North Indian Plains, Peninsular Plateau, Coastal Plains, Deserts and Island groups |     |
|            | 3  | Himalayan Rivers- Indus, Ganga and Brahmaputra River systems  |     |
|            | 4  | Rivers of Peninsular India- East and West flowing   |     |
| <b>II</b>  | <b>Climate</b>                           |   | 9   |
|            | 5  | Factors influencing the climate of India - Classification of Seasons  |     |
|            | 6  | Characteristics of monsoon-Onset, variability, Break and retreat  |     |
| <b>III</b> | <b>Soils and Environment</b>             |   | 9   |
|            | 7  | Classification of Soils by (ICAR) - Soil conservation   |     |
|            | 8  | Classification of Forests in India - Biosphere Reserves - National Parks  |     |
| <b>IV</b>  | <b>Demographic Characteristics</b>       |   | 9   |
|            | 9  | Characteristics of Indian Population : Distribution,Growth,Sex Ratio, Literacy, Religion,Rural- Urban Composition               |     |
|            | 10                                       | Racial Classification of India (BS Guha)-Distribution Tribal population   |     |
|            |  | Classification of Indian Languages : Linguistic Regions of India  |     |
| <b>V</b>   | <b>Economic Activities</b>               |   | 9   |
|            | 11                                       | Distribution of Major Crops : Rice, Wheat,Cotton,Sugarcane,Tea and Coffee - Green Revolution                                    |     |
|            | 12                                       | Minerals : Iron ore, Bauxite, Copper, Coal and Petroleum  |     |
|            | 13                                       | Industries : Iron and Steel ,Textile, and IT - Major Industrial Regions   |     |
|            | 14                                       | Transport : Road, Railway, Airways and Inland Waterways-Major ports   |     |

## PRACTICALS

(30 hours)

**Exercise 1:** Representation of major relief features by Contours - Concave Slope, Convex Slope, V-shaped Valley, Gorge, Hanging Valley, Ridge and Saddle, Escarpment, Spur, Sea-cliff, Waterfall, Cirque, Plateau

**Exercise 2:** Study of Indian Topographical maps: Layout and Numbering - Conventional Signs and Symbols - Grid reference - Measurement of Distance - Measurement of area: Grid Square Method

**Exercise 3:** Concept of Slope and Gradient: Expression of Slope: by Degrees and Percentage - Intervisibility

**Exercise 4:** Interpretation of Topographical maps (1:50,000 and 1:25,000): Marginal Information, Physical features: Relief, Drainage, Natural Vegetation, Cultural features: Settlements, Occupation, Agriculture and Irrigation, Industry, Transport and communication

**Study Tour/Field Work :** Geographical field based Study Tour for first hand experience of theoretical learning (not exceeding 5 days) and Prepare Tour Report

## References

- Majid Husain-Geography of India - 9th Edition-Mc Graw Hill,2020
- Surender Singh & Jitender Saroha -Geography of India 2ed 2019- G K Publication
- Khullar D R – India - A Comprehensive Geography, Kalyani Publishers, New Delhi,
- Dr. Ranganath-Geography of India-2019 ed-Mysore Book House
- Shafi M : Geography of South Asia, McMillan & Co, Calcutta, 2000.
- Singh R L (ed): India – A Regional Geography, National Geographical Society,India,Varanasi, 1971.
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- [https://www.newworldencyclopedia.org/entry/Climate\\_of\\_India](https://www.newworldencyclopedia.org/entry/Climate_of_India)
- <https://agritutorials.com/soil-classification/>
- [https://www.yourarticlelibrary.com/essay/anthropology/racial-classification-of-indian-people-by-different-anthropologist/41839#google\\_vignette](https://www.yourarticlelibrary.com/essay/anthropology/racial-classification-of-indian-people-by-different-anthropologist/41839#google_vignette)
- <https://censusindia.gov.in/census.website/>



### Course Outcomes

| No   | Upon completion of Population and Cultural Geography the graduate will be able to                                | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the basic concepts of physiography of India   | R,U             | PSO-1         |
| CO-2 | Discover the relationship between climate and seasons  | U,E             | PSO-1         |
| CO-3 | Create an awareness on the conservation and management of soil and natural vegetation and environmental problems | U,C             | PSO-1,4       |
| CO-4 | Analysis on demographical characteristics of India   | An              | PSO-1         |
| CO-5 | Evaluate the economic scenario of India  | U,E             | PSO-1         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: GEOGRAPHY OF INDIA**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the basic concepts of physiography of India   | PSO-1   | R,U             | F,C                | L                        | P             |
| 2      | Discover the relationship between climate and seasons  | PSO-1   | U,E             | C,M                | L                        |               |
| 3      | Create an awareness on the conservation and management of soil and natural vegetation and environmental problems | PSO-1,4 | U,C             | F,M                | L                        |               |
| 4      | Analysis on demographical characteristics of India   | PSO-1   | An              | F                  | L                        |               |
| 5      | Evaluate the economic scenario of India  | PSO-1   | U,E             | F                  | L                        |               |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     |       | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | -     | -     | -     | 3    | 1    | -    | -    | -    | -    | -    | -    |
| CO 3 | 2     | -     | -     | 2     | 3    | -    | -    | -    | -    | -    | -    | 2    |
| CO 4 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 5 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment / Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             | ✓          |            | ✓                         |
| CO 3 | ✓             | ✓          | ✓          | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             | ✓          | ✓          |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK5DSCGGY301</b>  |                  |                   |                    |                  |
| Course Title   | <b>PHYSICAL GEOGRAPHY OF INDIA</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | <b>V</b>   |                  |                   |                    |                  |
| Academic Level | 300-399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3                | -                 | 2                  | 5                |
| Pre-requisites | UK4DSCGGY200/UK4DSCGGY201  |                  |                   |                    |                  |
| Course Summary | The course covers the various aspects of physical features of India. It also focuses on the practical activities comprises representation of relief features by contours, conventional signs and symbols and interpretation of Survey of India toposheets. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                               | Content   | Hrs |
|------------|------------------------------------|---|-----|
| <b>I</b>   | <b>Physiography of India</b>       |   | 10  |
|            | 1                                  | Physiography of India – Location – Geopolitical Significance – Time zone  |     |
|            | 2                                  | Physiographic Divisions- Northern Mountains, North Indian Plains, Peninsular Plateau, Coastal Plains, Deserts and Island groups                           |     |
| <b>II</b>  | <b>Drainage System</b>             |   | 10  |
|            | 3                                  | Drainage System – Drainage basins , Drainage Patterns   |     |
|            | 4                                  | Himalayan Rivers- Indus River system, Ganga River System, Brahmaputra River system  |     |
|            | 5                                  | River Systems of Peninsular India- East and West flowing  |     |
| <b>III</b> | <b>Climate</b>                     |   | 8   |
|            | 6                                  | Climate - Factors influencing the climate of India – Mechanism of the Monsoon: Thermal Concept, Dynamic concept – Southern Oscillation – EL NINO, LA NINA |     |
|            | 7                                  | Seasons - Cold weather season, Hot weather season, Southwest Monsoon season, Retreating Monsoon season and Cyclones                                       |     |
|            | 8                                  | Climatic regions of India- Koeppen’s climatic classification, Agro-climatic zones of India  |     |
| <b>IV</b>  | <b>Soil and Natural Vegetation</b> |   | 8   |
|            | 9                                  | Soils in India- Classification of Soils by Indian Council of Agricultural Research (ICAR) – Soil conservation   |     |
|            | 10                                 | Natural Vegetation - Classification of Forests in India - Biosphere Reserves – National Parks – Wildlife Sanctuaries- Forest conservation                 |     |
| <b>V</b>   | <b>Environment</b>                 |   | 9   |
|            | 11                                 | Environmental Issues in India – Flood – Drought – Deforestation– Pollution: Air, Water, and Solid Waste disposal  |     |
|            | 12                                 | Problems- Population regions, Urbanization regions, Resources regions.  |     |

## PRACTICALS

(30hours)

**Exercise 1:** Representation of major relief features by Contours - Concave Slope, Convex Slope, V-shaped Valley, Gorge, Hanging Valley, Ridge and Saddle, Escarpment, Spur, Sea-cliff, Waterfall, Cirque, Plateau (Using with topographical maps of India)

**Exercise 2:** Study of Indian Topographical maps: Layout and Numbering – Conventional Signs and Symbols – Grid reference – Measurement of Distance – Measurement of area: Grid Square Method

**Exercise 3:** Concept of Slope and Gradient: Expression of Slope: by Degrees and Percentage – Intervisibility

**Exercise 4:** Interpretation of Topographical maps (1:50,000 and 1:25,000): Marginal Information, Physical features: Relief, Drainage, Natural Vegetation, Cultural features: Settlements, Occupation, Agriculture and Irrigation, Industry, Transport and communication

**Study Tour/Field Work:** Geographical field based Study Tour for first hand experience of theoretical learning (not exceeding 5 days) and Prepare Tour Report

## References

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- Surender Singh & Jitender Saroha -Geography of India 2ed 2019- G K Publication
- Khullar D R – India - A Comprehensive Geography, Kalyani Publishers, New Delhi,2000
- Dr. Ranganath-Geography of India-2019 ed-Mysore Book House
- Shafi M : Geography of South Asia, McMillan & Co, Calcutta, 2000.
- D R Khullar-India A Comprehensive Geography – Kalyani Publications,2018
- Singh R L (ed): India – A Regional Geography, National Geographical Society, India,Varanasi, 1971.
- Majid Hussain-Indian and World Geography - Mc Graw Hill ,2016
- Surender Singh & Jitender Saroha Geography of India for Civil Services Examination – Access Publishing-2014.
- Wadia D N: Geology of India, McMillan & Co. London 1967
- Singh Savindra, Environment Geography – Pravalika Publications,Allahabad, 2020

## Web References

- [https://www.newworldencyclopedia.org/entry/Climate\\_of\\_India](https://www.newworldencyclopedia.org/entry/Climate_of_India)
- <https://agritutorials.com/soil-classification/>

## Course Outcomes

| No | Upon completion of the course the graduate will be able to | Cognitive Level | PSO addressed |
|----|--|-----------------|---------------|
|----|--|-----------------|---------------|

|      |  |      |       |
|------|--|------|-------|
| CO-1 | Understand the basic concepts of physical Geography  | R,U  | PSO-1 |
| CO-2 | Identify the physiographic features of India   | R,U  | PSO-1 |
| CO-3 | Discover the relationship between climate and seasons  | An   | PSO-2 |
| CO-4 | Create an awareness on the conservation and management of soil and natural vegetation and environmental problems | C    | PSO-4 |
| CO-5 | Understand the role and application of topographical maps in Indian scenario                                     | U,AP | PSO-3 |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: PHYSICAL GEOGRAPHY OF INDIA**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|--------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the basic concepts of physical Geography  | PSO-1  | R,U             | F                  | L                        |               |
| 2      | Identify the physiographic features of India   | PSO-1  | R,U             | C                  | L                        |               |
| 3      | Discover the relationship between climate and seasons  | PSO-2  | An              | C                  | L                        |               |
| 4      | Create an awareness on the conservation and management of soil and natural vegetation and environmental problems | PSO-4  | C               | M                  | L                        |               |
| 5      | Understand the role and application of topographical maps in Indian scenario                                     | PSO-3  | U,AP            | P                  |                          | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | -     | 3     | -     | 3    | -    | 3    | -    | -    | -    | -    | -    |
| CO 3 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | -    | -    |
| CO 4 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | -    | -    |
| CO 5 | 3     | -     | -     | -     | -    | -    | -    | 2    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment / Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             | ✓          |            | ✓                         |
| CO 3 | ✓             | ✓          |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             | ✓          | ✓          |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK5DSCGGY302</b>  |                  |                   |                    |                  |
| Course Title   | <b>INDIA- SOCIAL AND ECONOMIC GEOGRAPHY</b>                                    |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | V  |                  |                   |                    |                  |
| Academic Level | 300 -399   |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 4 hours          | -                 |                    | 4 hours          |
| Pre-requisites | UK4DSCGGY200/UK4DSCGGY201  |                  |                   |                    |                  |
| Course Summary | The course focus with the basic ideas of social and economic settings of India |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                           | Content   | Hrs |
|------------|--------------------------------|---|-----|
| <b>I</b>   | <b>Population and Culture</b>  |   | 12  |
|            | 1                              | Population: Distribution; Growth and Demographic Transition in India -Demographic Characteristics of Indian Population- Sex Ratio, Literacy, Age composition, Rural – Urban Composition           |     |
|            | 2                              | Trends in Domestic and International Migration – National and State Level HDI and HPI in India – National Population Policy 2020  |     |
|            | 3                              | Culture – Religion and Religious Minorities – Racial Classification of India (BS Guha) – Tribes: Bhils, Santhals, Gonds and Nagas – Spatial Distribution of Scheduled Castes and Scheduled Tribes |     |
|            | 4                              | Language- Classification of Indian Languages; Linguistic Regions of India   |     |
| <b>II</b>  | <b>Indian Agriculture</b>      |   | 12  |
|            | 5                              | Salient Features of Indian Agriculture; Factors Affecting Agriculture in India; Cropping Pattern  |     |
|            | 6                              | Spatial Distribution of Major Crops – Food Crops: Rice and Wheat; Cash Crops: Cotton, Jute, Sugarcane; Beverage Crops: Tea and Coffee   |     |
|            | 7                              | Problems and Prospects of the Indian Agriculture Sector; Agro– Climatic Zones of India  |     |
|            | 8                              | Qualitative Changes in Indian Agriculture: Green Revolution, Irrigation Development and Land Reforms  |     |
| <b>III</b> | <b>Minerals and Industries</b> |   | 12  |
|            | 9                              | Minerals: Classification; Distribution of Economic Minerals- Iron ore, Manganese, Bauxite, Copper, Limestone, Coal, Petroleum and Rare Earths   |     |

|           |  |   |    |
|-----------|--|---|----|
|           | 10                                       | Industries: Classification; Locational Factors; Distribution -Agro-based Industries: Cotton Textile, Sugar and Tea - Mineral Based Industry: Iron and Steel, Aluminium & Copper, Petro Chemical Industry, Footloose Industries, and IT Industries - Major Industrial Regions of India- Special Economic Zones |    |
| <b>IV</b> | <b>Trade, Transport and Tourism</b>      |   | 12 |
|           | 11                                       | Transport: Classification- Distribution – Road, Railway, Airways and Inland Waterways, Regional Variations in Transport Density   |    |
|           | 12                                       | International Trade: Recent Trends- Composition of export and import - Direction of Foreign trade- Salient features   |    |
|           | 13                                       | Tourism: Tourism in India, Problems of Indian Tourism Industry, Eco-tourism in India.   |    |
| <b>V</b>  | <b>Regional Development and Planning</b> |   | 12 |
|           | 14                                       | Regional Development and Planning- Five year Plans, Command Area Development Programme (CADP), National Watershed Development Project for Rainfed Areas (NWDPR), Rain-fed Area Development Programme (RADP), Swarna Jayanthi Gram Swarozgar Yojana(SGSY), MGNREGA Project; The National Capital Region (NCR)  |    |

### References

- Geography of India, Majid Husain, 2013, Tata Mc GRAW-HILL's, New Delhi
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- Human Geography, Majid Husain, 2012, Rawat publications, Jaipur
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- <https://censusindia.gov.in/census.website/>
- [https://www.researchgate.net/publication/314206350\\_AGRO-ECOLOGICAL\\_ZONES\\_OF\\_INDIA](https://www.researchgate.net/publication/314206350_AGRO-ECOLOGICAL_ZONES_OF_INDIA)



### Course Outcomes

| No.   | Upon completion of the course the graduate will be able to                  | Cognitive Level | PSO addressed |
|-------|---|-----------------|---------------|
| CO-1  | Critically analyses the demographic profile and cultural structure of India | R,U,An          | PSO-1         |
| CO-2  | Evaluate the Salient Features and problems of Indian Agriculture            | U,E             | PSO-1         |
| CO- 3 | Analyze the various minerals and industries in India                        | U,An            | PSO-1,3       |
| CO- 4 | Evaluate the Trade, Transport and Tourism sectors in India                  | U,E             | PSO-1,3       |
| CO -5 | Critically evaluate the Regional Development Plans in India                 | U,E             | PSO-1         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: INDIA- SOCIAL AND ECONOMIC GEOGRAPHY**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PS O | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Critically analyses the demographic profile and cultural structure of India | PSO-1   | R,U,An          | F                  | L                        |               |
| 2      | Evaluate the Salient Features and problems of Indian Agriculture            | PSO-1   | U,E             | F,M                | L                        |               |
| 3      | Analyze the various minerals and industries in India                        | PSO-1,3 | U,An            | F                  | L                        |               |
| 4      | Evaluate the Trade, Transport and Tourism sectors in India                  | PSO-1,3 | U,E             | F,M                | L                        |               |
| 5      | Critically evaluate the Regional Development Plans in India                 | PSO-1   | U,E             | F                  | L                        |               |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
|------|------|------|------|------|-----|-----|-----|-----|-----|-----|
| CO 1 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   |
| CO 2 | 3    | -    | -    | -    | 3   | 2   | -   | -   | -   | -   |
| CO 3 | 2    | -    | 2    | -    | 3   | -   | -   | -   | -   | -   |
| CO 4 | 3    | -    | 2    | -    | 3   | -   | -   | -   | -   | -   |
| CO 5 | 2    | -    | -    | -    | 3   | -   | -   | -   | -   | -   |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          |            | ✓                         |
| CO 5 | ✓             | ✓          | ✓          |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK5DSCGGY303</b>  |                  |                   |                    |                  |
| Course Title   | <b>DISASTER MANAGEMENT</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | V  |                  |                   |                    |                  |
| Academic Level | 300 - 399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites | UK4DSCGGY200/UK4DSCGGY201  |                  |                   |                    |                  |
| Course Summary | The course focus on attaining theoretical and practical awareness about disasters and its management methods, application of GIS in Disaster Management. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content   | Hrs |
|------------|--|---|-----|
| <b>I</b>   | <b>Introduction to Disasters</b>   |   | 10  |
|            | 1  | Definitions of hazard, vulnerability, risk and disaster; causes of disaster   |     |
|            | 2  | Classification of disasters – based on origin/cause - natural and man-made disasters, based on speed – slow and sudden disasters.   |     |
|            | 3  | Study of natural disasters - Earthquakes, Floods, Drought, Landslide, Cyclones, Volcanism, Coastal Disasters, Tsunami<br>Global trends in disasters-urban disasters, pandemics, complex emergencies, climate change – global warming, sea level rise, ozone depletion |     |
|            | 4  | Impact of disasters - economic, social and environmental, psychosocial  |     |
| <b>II</b>  | <b>Basic Aspects in Disaster Management</b>  |   | 6   |
|            | 5  | Disasters Management -definition; Disaster Management Cycle – mitigation, preparedness, response, recovery  |     |
|            | 6  | Disaster Management Plan – Components   |     |
|            | 7  | National and State bodies in disaster management; Institutional arrangements for disaster management  |     |
|            | 8  | Important sectors in disaster management: health and medical sector, communications, insurance, social work, NGO's, media, fire services, police and paramilitary services and armed forces   |     |
| 9          | Disaster Relief and its components – water, food, sanitation, shelter, health and waste management |   |     |
| <b>III</b> | <b>Community based disaster management</b>   |   | 10  |
|            | 9  | Community based disaster management -definition– features, components   |     |
|            | 10   | Differential impact of disasters on people based on caste, gender, age, location and disability   |     |
|            | 11   | Impact of development projects such as dams, industries and changes in  |     |

|           |  |   |    |
|-----------|--|---|----|
|           |  | Land use; Challenges in community-based disaster management   |    |
| <b>IV</b> | <b>Hazard and Vulnerability Profile of India</b> |   | 10 |
|           | 12   | Disaster prone or vulnerable areas in India with emphasis to cyclones, earthquakes and floods   |    |
|           | 13   | Structural and Non-structural measures for disaster risk reduction in earthquake, cyclone and flood prone areas   |    |
| <b>V</b>  | <b>Geo-informatics in Disaster Management</b>    |   | 9  |
|           | 14   | Application of remote sensing, GIS and GPS techniques in disaster management - Earthquakes, Landslides, Flood, Cyclones, Tsunamis And Pandemics               |    |
|           | 15   | Geo-portals for disaster response and management- USGS Earth Explorer, National Spatial Data Infrastructure (NSDI), Open Street map, Sahana EDEN, NRSC Bhuvan |    |
|           | 16   | Emergency planning and management - Early Warning Systems in India  |    |

## PRACTICALS

(30 hours)

**Exercise 1 :** Visit to Disaster affected / vulnerable areas and prepare Report

## References

- Bodkin E (1982) Environmental Studies, Charles E Merrill Pub. Co., Columbus, Ohio.
- Odum E P (1971) Fundamentals of Ecology, W B Saunders, Philadelphia.
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- <https://bhuvan-app1.nrsc.gov.in/bhuvandisaster>
- <https://ndmindia.mha.gov.in/images/publicawareness/ICT%20for%20Disaster%20Risk%20Reduction.pdf>

## Course Outcomes

| No.  | Upon completion of the course the graduate will be able to   | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the basic concept of disasters and its attributes | U               | PSO-1         |

|      |  |       |         |
|------|--|-------|---------|
| CO-2 | Identify and summarize the processes involved in disaster management.<br>Learn about the national initiatives and framework related to disaster management | R, U  | PSO-1   |
| CO-3 | Analyse the vulnerability of different sectors of population to disaster   | U, An | PSO-1,2 |
| CO-4 | Understand the disaster profile of the country and various measures used for disaster reduction  | U,Ap  | PSO-1,3 |
| CO-5 | Evaluate and apply geospatial methods, data and tools that can strengthen different phases of disaster management.   | E,Ap  | PSO-3   |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: DISASTER MANAGEMENT**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the basic concept of disasters and its attributes   | PSO-1   | U               | F, C               | L                        | -             |
| 2      | Identify and summarize the processes involved in disaster management.<br>Learn about the national initiatives and framework related to disaster management | PSO-1   | R, U            | P,C                | L                        | P             |
| 3      | Analyse the vulnerability of different sectors of population to disaster   | PSO-1,2 | U, An           | P                  | L                        | P             |
| 4      | Understand the disaster profile of the country and various measures used for disaster reduction  | PSO-1,3 | U,Ap            | C                  | L                        | -             |

|   |  |       |      |   |   |   |
|---|--|-------|------|---|---|---|
| 5 | Evaluate and apply geospatial methods, data and tools that can strengthen different phases of disaster management. | PSO-3 | E,Ap | M | L | - |
|---|--|-------|------|---|---|---|

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | -     | -     | -     | 3    | 3    | -    | -    | -    | -    | -    | -    |
| CO 3 | 2     | 3     | -     | -     | -    | 2    | 3    | -    | -    | -    | -    | -    |
| CO 4 | 2     | -     | 2     | -     | 3    | 3    | -    | -    | -    | -    | -    | -    |
| CO 5 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | -    | 3    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             | ✓          |            |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK5DSCGGY304</b>   |                  |                   |                    |                  |
| Course Title   | <b>HUMAN GEOGRAPHY</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>  |                  |                   |                    |                  |
| Semester       | V   |                  |                   |                    |                  |
| Academic Level | 300-399   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 4 hours          | -                 | -                  | 4                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | This paper focuses on various dimensions on Human Geography .It includes nature and scope , different approaches ,spatial interaction, distribution of various religions , races, languages and types and pattern of human settlements. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module | Unit                              | Content  | Hrs |
|--------|-----------------------------------|--|-----|
| I      | <b>Basic Concepts</b>             |  | 12  |
|        | 1                                 | Definition ,Nature and scope of Human Geography  |     |
|        | 2                                 | Understanding of man nature relationship: Determinism, Possibilism and Neo-determinism.A brief study of Contributions of Alexander Von Humboldt, Carl Ritter, Friedrich Ratzel and Vidal de la Blache. |     |
|        | 3                                 | Approaches to the study of Human Geography: A brief overview of Radical approach, Welfare approach, and Behavioural approach.  |     |
| II     | <b>Spatial Interaction</b>        |  | 12  |
|        | 4                                 | Spatial Interaction and Spatial Behaviour: Basis of Interaction: Edward Ullman Model - Complementarities, Transferability, and Intervening Opportunity.  |     |
|        | 5                                 | Measuring Interaction: Distance Decay Model, Gravity Model, Potential Model.   |     |
| III    | <b>Culture</b>                    |  | 12  |
|        | 6                                 | Components of culture: Cultural trait, Cultural complex, Cultural regions, Cultural realms-cultural hearth   |     |
|        | 7                                 | Cultural regions and realms of the world   |     |
|        | 8                                 | Cultural landscape and Cultural ecology  |     |
| IV     | <b>Religions, Races Languages</b> |  | 12  |
|        | 9                                 | Classification of Religion; Universalizing Religions, Ethnic Religions, Traditional religions.   |     |
|        | 10                                | Major Religions of the World; Christianity, Islam, Hinduism, Buddhism, Judaism, Secularism   |     |
|        | 11                                | Races : Major races of the world- Caucasoid , Negroid, Mongoloid and Australoid  |     |
|        | 12                                | Major tribes of the world: Pygmies, Bushmen ,Masai, Bedouin, Eskimo  |     |

|   |                          |  |    |
|---|--------------------------|--|----|
|   | 13                       | Languages: Major language families of the world              |    |
| V | <b>Human Settlements</b> |  | 12 |
|   | 14                       | Human Settlements – Rural – Types and Patterns and Functions |    |
|   | 15                       | Urban Settlements – Urbanization – Pattern and Functions     |    |
|   | 16                       | Urban Morphology- Burgess Model, Hoyts model                 |    |
|   | 17                       | Urban Problems.  |    |

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- De Blij, H.J.(1996): Human Geography: Culture, Society and Space,. 2nd edition. John Wiley and Sons, New York.
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- <https://gyansanchay.csjmu.ac.in/wp-content/uploads/2022/09/Concept-of-Possibilism.pdf>
- <https://education.nationalgeographic.org/resource/language-family/>
- <https://www.britannica.com/summary/language>
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- <https://ncert.nic.in/ncerts/l/legy204.pdf>
- <https://www.nios.ac.in/media/documents/316courseE/ch29.pdf>



### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to   | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the basic concepts of Human Geography and analyse the complex relationships between humans and their physical and social environments, and critically evaluate the impact of human activities on the natural world. | U, An, E        | PSO-1, 2      |
| CO-2 | Analyse the interrelationships between space and society   | An              | PSO-2         |
| CO-3 | Understand how culture and its components diffuse  | U               | PSO-1         |
| CO-4 | Critically examine the world distribution pattern of various religions, languages and races.   | R, Ap           | PSO3          |
| CO-5 | Enhance the understanding of human settlements through a critical appraisal of its types, patterns ,functions and problems   | R, U, Ap        | PSO-2, 3      |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: HUMAN GEOGRAPHY**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/PS O  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|----------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the basic concepts of Human Geography and analyse the complex relationships between humans and their physical and social environments, and critically evaluate the impact of human activities on the natural world. | PSO-1, 2 | U, An, E        | C ,F               | L                        |               |
| 2      | Analyse the interrelationships between space and society   | PSO-2    | An              | F ,M               | L                        |               |
| 3      | Understand how culture and its components diffuse  | PSO-1    | U               | F ,C               | L                        |               |
| 4      | Critically examine the world distribution pattern of various religions, languages and races.   | PSO3     | R, Ap           | M                  | L                        |               |

|   |  |          |          |   |   |  |
|---|--|----------|----------|---|---|--|
| 5 | Enhance the understanding of human settlements through a critical appraisal of its types, patterns ,functions and problems | PSO-2, 3 | R, U, Ap | M | L |  |
|---|--|----------|----------|---|---|--|

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | 3     | -     | -     | 3    | -    | -    | 1    | -    | -    | -    | -    |
| CO 2 | -     | 3     | -     | -     | -    | 3    | -    | -    | -    | -    | -    | -    |
| CO 3 | 3     | -     | -     | -     | 3    | -    | -    | 1    | -    | -    | -    | -    |
| CO 4 | -     | -     | 1     | -     | -    | -    | -    | -    | -    | 1    | -    | -    |
| CO 5 | -     | 2     | 1     | -     | 3    | -    | 1    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment / Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             | ✓          |            | ✓                         |
| CO 3 | ✓             | ✓          | ✓          | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             | ✓          | ✓          |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK5DSEGGY300</b>  |                  |                   |                    |                  |
| Course Title   | <b>THERMAL AND MICROWAVE REMOTE SENSING</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | V  |                  |                   |                    |                  |
| Academic Level | 300-399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | This course provides a comprehensive knowledge about Thermal and Microwave Remote Sensing, which is utilized in utility services and weather interpretation. Moreover, applications include Urban studies and Hydrology. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content  | Hrs |
|------------|---|--|-----|
| <b>I</b>   | <b>Introduction to Thermal Remote Sensing</b>   |  | 9   |
|            | 1   | Fundamentals of Thermal Remote Sensing: Meaning and Concept  |     |
|            | 2   | Thermal properties of materials: Heat Capacity, Conductivity, Thermal Inertia, Thermal Diffusivity   |     |
|            | 3   | Thermal radiation principles-Spectral Emissivity of common materials   |     |
|            | 4   | Concept of Kinetic Temperature vs. Radiant Temperature   |     |
| 5          | Applications of Thermal Remote Sensing: Geothermal Exploration, Urban Heat Island, Soil Moisture, Seismology, Hydrology, Forest Fires |  |     |
| <b>II</b>  | <b>Interpretation of Thermal Imagery</b>  |  | 9   |
|            | 6   | Factors affecting Thermal Images: Effect of Atmosphere and Weather   |     |
|            | 7   | Interaction of Thermal radiation with terrain elements   |     |
|            | 8   | Geometric characteristics of Thermal imagery   |     |
| 9          | Interpreting Thermal imagery: Qualitative and Quantitative methods- Interpretation of Day and Night-time Thermal Images               |  |     |
| <b>III</b> | <b>Data Products and Applications of Thermal Imaging</b>  |  | 9   |
|            | 10  | Multispectral Thermal Data Products: Characteristic features of Landsat, IRS, ASTER, MODIS, GOES, AVHRR.                                   |     |
|            | 11  | Atmospheric Correction of Thermal Infrared Images: Need, Methods   |     |
| 12         | Estimation of Land Surface Temperature and Sea Surface Temperature  |  |     |
| <b>IV</b>  | <b>Principles of Microwave Remote Sensing</b>   |  | 9   |
|            | 13  | Introduction to Microwave remote sensing: Concept and Principles, Backscattering, Cross section wavelength, Incidence angle, Aspect angle, |     |

|   |   |  |          |
|---|---|--|----------|
|   |   | Aircraft Radar system  |          |
|   | 14  | Passive & Active Microwave sensors- Imaging and Non-Imaging Radar  |          |
|   | 15  | Radar Return and Image Signatures: System properties, Terrain properties                                   |          |
|   | 16  | Transmission characteristics of Radar signals and Interpretation of Radar Imagery- Radar image Distortions |          |
| V | <b>SLAR, SAR, LiDAR, and Applications of Microwave RS</b> |  | <b>9</b> |
|   | 17  | Side Looking Airborne Radar (SLAR): Resolutions, Uses and Limitations                                      |          |
|   | 18  | SAR: Bands, Frequency and Wavelength of OLI, Sentinel, MSMR- InSAR   |          |
|   | 19  | Principles, Components of LiDAR remote sensing and it's Applications                                       |          |
|   | 20  | Applications of Microwave Remote Sensing in Earth Science studies  |          |

### Practical

(30 Hours)

**Exercise 1:** Calculation of at satellite radiance and true surface radiance

**Exercise 2:** Computation of brightness temperature from thermal imagery

**Exercise 3:** Calculation of emissivity fractional vegetation cover

**Exercise 4:** Calculation of Land Surface Temperature

**Exercise 5:** Radar Image Interpretation

### References

- Drury, S.A., 1987: Image Interpretation in Geology. Allen and Unwin
- Gupta, R.P., 1990: Remote Sensing Geology. Springer Verlag.
- Jensen, J.R. 2000: Remote Sensing of the Environment: An Earth resource Perspective. Prentice Hall
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- <https://natural-resources.canada.ca>
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- <https://www.radartutorial.eu>
- <http://forsys.cfr.washington.edu>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Categorize Spectral emissivity of earth materials          | An              | PSO-2         |
| CO-2 | Identify factors affecting Thermal Remote Sensing          | Ap              | PSO-3         |
| CO-3 | Differentiate sensor resolutions of various missions       | An              | PSO-3         |
| CO-4 | Distinguish Imaging, Non-Imaging Microwave sensors         | An              | PSO-2         |
| CO-5 | Apply Microwave RS in Earth Science studies                | Ap              | PSO-3         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: THERMAL AND MICROWAVE REMOTE SENSING**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/ PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Categorize Spectral emissivity of earth materials     | PSO-2   | An              | F                  | L                        | -             |
| 2      | Identify factors affecting Thermal Remote Sensing     | PSO-3   | Ap              | P                  | L                        | -             |
| 3      | Differentiate sensor resolutions of various missions. | PSO-3   | An              | P                  | L                        | -             |
| 4      | Distinguish Imaging, Non-Imaging Microwave sensors.   | PSO-2   | An              | P                  | -                        | P             |
| 5      | Apply Microwave RS in Earth Science studies           | PSO-3   | Ap              | M                  | -                        | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | -     | 3     | 3     | -     | -    | 3    | 3    | -    | -    | 3    | 3    | -    |
| CO 2 | -     | -     | 3     | -     | -    | 3    | 3    | -    | -    | 3    | 3    | -    |
| CO 3 | -     | -     | 2     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 4 | -     | 3     | 3     | -     | -    | -    | -    | -    | -    | -    | -    | -    |
| CO 5 | -     | 3     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             |            | ✓          | ✓                         |
| CO 3 | ✓             |            | ✓          | ✓                         |
| CO 4 | ✓             | ✓          |            | ✓                         |
| CO 5 | ✓             |            |            |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK5DSEGGY301</b>  |                  |                   |                    |                  |
| Course Title   | <b>DIGITAL IMAGE PROCESSING</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | V  |                  |                   |                    |                  |
| Academic Level | 300-399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | This course aims to dispense principles of Digital Image Processing involving image enhancement and information extraction from digital satellite images |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Introduction to Digital Image</b>              |   | 9   |
|            | 1   | Introduction to Digital image: Concept of Digital and Analog image-Image Processing systems, Hardware, and Software considerations  |     |
|            | 2   | History of Digital Image Processing: Early 1920's to Present  |     |
|            | 3   | Analog to Digital Image Conversion: Image Sampling and Quantization   |     |
| <b>II</b>  | <b>Digital Image Acquisition and Data Formats</b> |   | 9   |
|            | 4   | Digital Image data acquisition: Automated collection (Sensor-derived data), Manual recording of Empirical observations and obtaining existing data from other sources-Data Acquisition Considerations |     |
|            | 5   | Digital image Data formats, Image data storage and retrieval  |     |
|            | 6   | Digital Image Processing: Low, Mid and High-Level Processes   |     |
| <b>III</b> | <b>Image Preprocessing</b>                        |   | 9   |
|            | 7   | Digital Image Pre-processing: Types of Image Distortions and Need for Image Correction  |     |
|            | 8   | Radiometric Correction: Nature of Radiometric Errors- Systematic and Non-Systematic Errors-Noise Removal, Destripping, Line Drop out correction-Atmospheric Correction Methods                        |     |
|            | 9   | Geometric Correction: Internal and External geometric errors- Image-to-map rectification, Image-to-image registration, Orthorectification   |     |
| <b>IV</b>  | <b>Image enhancement</b>                          |   | 9   |
|            | 10  | Overview of Image enhancement techniques: Point and Local Operations  |     |
|            | 11  | Contrast Enhancement: Gray level thresholding, Histogram Equalizations, Level Slicing, Contrast Stretching  |     |
|            | 12  | Spatial Enhancement: Spatial filtering, Convolution, Edge enhancement, Image smoothing  |     |

|   |  |   |   |
|---|--|---|---|
|   | 13   | Multi image manipulation: Image Transformation: Arithmetic operations and Image fusion Band rationing, Principal Component analysis |   |
| V | <b>Image classification and Information Extraction</b> |   | 9 |
|   | 14   | Pattern recognition and Image classification: Unsupervised classification: Advantages and Limitations                               |   |
|   | 15   | Supervised classification: Training site selection, Signature file, Classifiers   |   |
|   | 16   | Classification accuracy assessment (Error matrix and Kappa coefficient)   |   |

**Practical**

**(30 Hours)**

**Exercise 1:** Image Pre-processing Techniques

**Exercise 2:** Radiometric and Geometric Corrections

**Exercise 3:** Spatial Enhancement Techniques

**Exercise 4:** Spectral Enhancement

**Exercise 5:** Radiometric Enhancement

**References**

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- <https://ebooks.inflibnet.ac.in>
- <https://gisrsstudy.com>
- <https://pressbooks.lib.vt.edu>
- <https://ecampusontario.pressbooks.pub>
- <https://gisgeography.com/>

**Course Outcomes**

| No.  | Upon completion of the course the graduate will be able to | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Summarize Concept & History of Digital Image Processing    | U               | PSO-1         |



|      |  |    |         |
|------|--|----|---------|
| CO-2 | Outline Image acquisition methods, Data formats & DIP      | An | PSO-2,3 |
| CO-3 | Investigate image distortions & suggest correction methods | E  | PSO-3   |
| CO-4 | Apply enhancement techniques on Digital image data         | Ap | PSO-3   |
| CO-5 | Generate spatial information through image classification  | C  | PSO-3   |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: DIGITAL IMAGE PROCESSING**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/ PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|----------|-----------------|--------------------|--------------------------|---------------|
| 1      | Summarize Concept & History of Digital Image Processing    | PSO -1   | P               | U                  | L                        | -             |
| 2      | Outline Image acquisition methods, Data formats & DIP      | PSO -2,3 | F               | An                 | L                        | -             |
| 3      | Investigate image distortions & suggest correction methods | PSO -3   | M               | E                  | L                        | -             |
| 4      | Apply enhancement techniques on Digital image data         | PSO -3   | M               | Ap                 | -                        | P             |
| 5      | Generate spatial information through image classification  | PSO -3   | M               | C                  | -                        | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO<br>1 | PSO<br>2 | PSO<br>3 | PSO<br>4 | PO<br>1 | PO<br>2 | PO<br>3 | PO<br>4 | PO<br>5 | PO<br>6 | PO<br>7 | PO<br>8 |
|------|----------|----------|----------|----------|---------|---------|---------|---------|---------|---------|---------|---------|
| CO 1 | 3        | -        | -        | -        | 3       | -       | -       | 3       | -       | -       | -       | -       |
| CO 2 | -        | 3        | 3        | -        | -       | 3       | 3       | -       | -       | 3       | 3       | -       |
| CO 3 | -        | -        | 3        | -        | -       | -       | -       | -       | -       | 3       | 3       | -       |
| CO 4 | -        | -        | 3        | -        | -       | -       | -       | -       | -       | 3       | 3       | -       |
| CO 5 | -        | -        | 3        | -        | -       | -       | -       | -       | -       | 3       | 3       | -       |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programmings Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal<br>Exam | Assignment | Seminar | End Semester Examinations |
|------|------------------|------------|---------|---------------------------|
| CO 1 | ✓                | ✓          |         | ✓                         |
| CO 2 | ✓                |            |         | ✓                         |
| CO 3 | ✓                |            |         | ✓                         |
| CO 4 | ✓                | ✓          | ✓       | ✓                         |
| CO 5 |                  |            | ✓       |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK5DSEGGY302</b>  |                  |                   |                    |                  |
| Course Title   | <b>TOPOGRAPHIC AND HYDROGRAPHIC SURVEYING</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | V  |                  |                   |                    |                  |
| Academic Level | 300-399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | This course aims to impart principles of Topographic Surveying, Hydrographic Surveying. The learner will be acquainted with basics of Astronomy, Spherical trigonometry required for a surveyor to calculate true north line and bearing |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                      | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Topographic Surveying</b>              |   | 3   |
|            | 1   | Introduction of Topographic Surveying: History, Importance, Applications  |     |
|            | 2   | Challenges and Limitations to Topographic Surveying   |     |
| <b>II</b>  | <b>Representation of Relief Features</b>  |   | 8   |
|            | 3   | Different methods of representing Relief: Hachures, Form lines, Spot heights, Benchmarks, Contours                    |     |
|            | 4   | Contours: Characteristics, Contour interval - Factors affecting Contour Interval                                      |     |
|            | 5   | Contouring in Surveying: Horizontal Equivalent, Valley Line, Ridge Line   |     |
| <b>III</b> | <b>Procedures of a Topographic Survey</b> |   | 10  |
|            | 6   | Interpolation of Contours: Estimation, Arithmetical calculation, Graphical  |     |
|            | 7   | Planning a Topographic survey: Establishing horizontal and vertical control points - Instruments for locating details |     |
|            | 8   | Methods for locating details: Controlling point and Cross profile method  |     |
| <b>IV</b>  | <b>Hydrographic Surveying</b>             |   | 12  |
|            | 9   | Checkerboard or Grid method and Trace contour method  |     |
|            | 10  | Direct Contouring, Indirect contouring: Squares, Cross-Section, Radial Line Methods                                   |     |
| <b>IV</b>  | <b>Hydrographic Surveying</b>             |   | 12  |
|            | 11  | Introduction of Hydrographic Surveying, Horizontal Control & Vertical Control in Hydrographic Surveying               |     |
|            | 12  | Tidal Datum, Theory of tides - Effect of Moon and Sun - Types of tide Gauges  |     |
|            | 13  | Sounding: Utility and different methods of Sounding. Echo Sounder: Advantages and limitations                         |     |

| <b>Basics of Astronomical Survey</b> |    |  |
|--------------------------------------|----|--|
| <b>V</b>                             | 14 | Basics of astronomy for a surveyor: Concept of Celestial Sphere, Zenith and Nadir, Celestial Poles, Celestial Equator, Celestial Horizon, Celestial Meridian, Observers Meridian, Declination Circle, Vertical Circle, Prime Vertical. |
|                                      | 15 | Astronomical Co-ordinate Systems: Right ascension and Declination System, Declination and Hour Angle System, Altitude and Azimuth System   |
|                                      | 16 | Spherical Trigonometry - Determination of Azimuth by Sun and star  |
|                                      |    | 12   |

**Practical**

**(30 Hours)**

**Exercise 1:** Relief representation by Hachures and Form lines

**Exercise 2:** Contour generation with DEM data

**Exercise 3:** Bathymetric Profiles from Echo Sounder Data

**Exercise 4:** Estimating Sea Level Rise using Satellite data

**Exercise 5:** Azimuth determination by Celestial Observation

**References**

- Surveying and Levelling by N. N. Basak, Tata McGraw-Hill.
- Surveying and Levelling Vol-II by Dr. B. C. Punmia, Laxmi Publication.
- Surveying and Levelling by S. K. Duggal, Tata McGraw-Hill.
- Plane Surveying by Alak De, S. Chand & Company Pvt. Ltd. New Delhi.
- Conventional sign for topographical map by Survey of India. Surveying Vol.-2, 3 by Dr. K. R. Arora, Standard Book House
- Surveying and Levelling Part 2 by T. P. Kanetkar & S. V. Kulkarni, Pune Vidhyarthi Griha Prakashan.
- Surveying and Levelling Vol.2, 3 by Dr. B. C. Punmia, Laxmi Publication.
- Surveying and Levelling Vol.2 S. K. Duggal TATA McGraw-Hill

**Web References**

- <https://onlinemaps.surveyofindia.gov.in>
- [Topographic Mapping | U.S. Geological Survey \(usgs.gov\)](https://www.usgs.gov/learn/topographic-mapping)
- <https://cardinalsurveying.com/>
- <https://iho.int/> Manual on Hydrography
- <https://oceanservice.noaa.gov>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                    | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understand importance and applications of Topographic Surveying               | U               | PSO-1         |
| CO-2 | Illustrate relief features through various methods                            | An              | PSO-3         |
| CO-3 | Plan a Topographic survey and Contouring                                      | E               | PSO-3         |
| CO-4 | Comprehend and Plan Hydrographic Surveying with different methods of Sounding | E               | PSO-1,3       |
| CO-5 | Infer Basics of astronomy and Spherical Trigonometry                          | U               | PSO-1         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: TOPOGRAPHIC AND HYDROGRAPHIC SURVEYING**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/ PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|----------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand importance and applications of Topographic Surveying               | PSO -1   | U               | F                  | L                        | -             |
| 2      | Illustrate relief features through various methods                            | PSO -3   | An              | P                  | L                        | -             |
| 3      | Plan a Topographic survey and Contouring                                      | PSO -3   | E               | M                  | L                        | -             |
| 4      | Comprehend and Plan Hydrographic Surveying with different methods of Sounding | PSO -1,3 | E               | M                  | -                        | P             |
| 5      | Infer Basics of astronomy and Spherical Trigonometry                          | PSO -1   | U               | C                  | L                        | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | 2    | -    | -    | -    | -    |
| CO 2 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 3 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 4 | 3     | -     | 2     | -     | 3    | -    | -    | 2    | -    | 3    | 3    | -    |
| CO 5 | 3     | -     | -     | -     | 3    | -    | -    | 2    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            | ✓          | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 |               |            |            |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK5DSEGGY303</b>   |                  |                   |                    |                  |
| Course Title   | <b>DISASTER RESPONSE, RECOVERY AND RECONSTRUCTION</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>  |                  |                   |                    |                  |
| Semester       | V   |                  |                   |                    |                  |
| Academic Level | 300 - 399   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | This course equips participants with the knowledge and skills necessary to effectively respond to, reconstruct, and recover from disasters. It covers key concepts such as disaster preparedness, response coordination, infrastructure rebuilding, community resilience, and long-term recovery planning |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Disaster Response</b>                              |   | 9   |
|            | 1   | Disaster Response- Essential Components of Disaster Response  |     |
|            | 2   | Disaster Response Plan; Resource Management- Financial, Medical, equipment, communication, Human, transportation, Food and essential commodity , Directing and controlling functions ,Communication, Participation & activation of Emergency Preparedness Plan, Logistics Management, Emergency support functions |     |
|            | 3   | Disaster Preparedness for Response - Scenario building and contingency planning Mock drills and table top exercises - Emergency Support Functions and Coordination - Logistics and supply chain management - Emergency Operation Centres  |     |
| <b>II</b>  | <b>Disaster Response System</b>                       |   | 9   |
|            | 4   | Disaster Response - Incident Response System - Evacuation - Search and Rescue - Emergency Health Management - Emergency Humanitarian Assistance   |     |
|            | 5   | Psychological Response and Management Psychological Response and Management (Trauma, Stress, Rumour and Panic); Relief and Recovery Medical Health Response to Different Disasters  |     |
| <b>III</b> | <b>Rehabilitation, Reconstruction and Development</b> |   | 9   |
|            | 6   | Types of Rehabilitation; Post Disaster Damage assessment, estimated damage assessment due to probable disasters; Sample Surveys, Epidemiological Surveillance, Nutrition Centered Health Assessment.  |     |
|            | 7   | Reconstruction; Speedy Reconstructions- Essential services, Social infrastructures, immediate shelters/camps, Contingency plans for reconstructions, Development of Physical and Economic Infrastructure-Developing Physical and Economic Infrastructure, Environmental   |     |

|    |                          |  |   |
|----|--------------------------|--|---|
|    |                          | Infrastructure development   |   |
|    | 8                        | Disaster Resistant House Construction Guidelines for Disaster resistant construction, traditional techniques, Seismic strengthening of houses in low rain/High rainfall area, earthquake resistant construction technique ; Funding arrangements- Funding arrangements at state level and central level, Fiscal discipline, role of International agencies |   |
|    | 9                        | Disaster Relief - Standard and Principles - SPHERE Core Standards of Relief - Minimum Standards of Relief - SDRF Norms for Disaster Relief & Rehabilitation  |   |
| IV | <b>Reconstruction</b>    |  | 9 |
|    | 10                       | Rehabilitation Rehabilitation - Socio- economic Rehabilitation- Temporary Livelihood Options and Socio-Economic Rehabilitation Education and awareness and role of Information Dissemination, Participative Rehabilitation; Role of various agencies in Recovery Work- Monitoring and Evaluation of rehabilitation work, Rehabilitation process            |   |
| V  | <b>Disaster Recovery</b> |  | 9 |
|    | 11                       | Disaster Recovery - Early recovery and long-term recovery - Inclusive recovery - Livelihood recovery - Psycho-social recovery<br>Building Back Better - Concept and principles of Build Back Better - Build back houses and habitat - Build back infrastructure - Build back communities   |   |

**PRACTICAL  
Hours)**

**(30**

**Exercise 1:** Emergency Response Drills

**Exercise 2:** Mapping Vulnerable Areas

**Exercise 3:** Green Infrastructure Projects

**Exercise 4:** Partnerships with Local Organizations: Conduct Training and awareness programmes.

**References:**

- Sharma, V.K. (ed.): Disaster Management, Indian Institute of Public Administration, New Delhi.
- Mishra, G.K. and Mathur G.C.(1993) Natural Disaster Reduction, Reliance Public House, New Delhi.
- Thomas, Babu,1993, Disaster Response: A Handbook for Emergencies,
- Maharashtra Emergency Earthquake Rehabilitation Programme, Programme Management Unit, Earthquake Relief and Rehabilitation Cell, Government of Maharashtra, Mumbai.
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- G.C. Mathur, Housing in Disaster Prone Areas, National Buildings Organisation and UN Regional Housing Centre, ESCAP, New Delhi,. 1986.
- Elementary principles of rescue by Got. Of India, ministry of Home Affairs



- Rescue Service Manual by HMSO 3. Rescue –Civil defense handbook by HMSO
- Penn Well, “Technical rescue operation”, volume- II; Larry Collins
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- Mishra, G.K. and Mathur G.C.(1993) Natural Disaster Reduction, Reliance Public House, New Delhi.
- Thomas, Babu,1993, Disaster Response: A Handbook for Emergencies,

### Web References

- <https://egyankosh.ac.in/bitstream/123456789/25477/1/Unit-1.pdf>
- <https://nidm.gov.in/PDF/pubs/NDRP.pdf>
- [https://ndma.gov.in/Capacity\\_Building/Ops\\_Comm/IRS](https://ndma.gov.in/Capacity_Building/Ops_Comm/IRS)
- [https://aapdasuraksha.mp.gov.in/EWS\\_About.aspx](https://aapdasuraksha.mp.gov.in/EWS_About.aspx)
- <https://egyankosh.ac.in/bitstream/123456789/25891/1/Unit-15.pdf>
- <https://www.devalt.org/newsletter/may01/lead.htm#:~:text=The%20process%20of%20reconstruction%20involves,get%20back%20to%20their%20feet.>
- <https://www.vmware.com/topics/glossary/content/disaster-recovery.html#:~:text=Disaster%20recovery%20relies%20upon%20the,the%20data%20is%20backed%20up.>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to   | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the principles and practices of disaster response procedure.  | U               | PSO- 1        |
| CO-2 | Develop skills in coordinating and managing disaster response efforts  | Ap              | PSO- 4        |
| CO-3 | Gain knowledge of strategies and best practices for long-term recovery and reconstruction  | U               | PSO- 1        |
| CO-4 | Introduce mechanisms for monitoring and evaluating the effectiveness of rehabilitation activities                                      | Ap              | PSO- 4        |
| CO-5 | Establish monitoring and evaluation mechanisms to track progress, identify challenges, and inform future disaster recovery initiatives | C               | PSO- 3        |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: DISASTER RESPONSE, RECONSTRUCTION AND RECOVERY**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO   | PO/ PSO | Cognitive Level | Knowledge Category | Lecture (L) / Tutorial (T) | Practical (P) |
|--------|--|---------|-----------------|--------------------|----------------------------|---------------|
| 1      | Understand the principles and practices of disaster response procedure.  | PSO - 1 | U               | F, C               | L                          | -             |
| 2      | Develop skills in coordinating and managing disaster response efforts  | PSO - 5 | Ap              | P                  | L                          | P             |
| 3      | Gain knowledge of strategies and best practices for long-term recovery and reconstruction  | PSO - 1 | U               | F, C               | L                          | -             |
| 4      | Introduce mechanisms for monitoring and evaluating the effectiveness of rehabilitation activities                                      | PSO - 4 | Ap              | M, P               | L                          | P             |
| 5      | Establish monitoring and evaluation mechanisms to track progress, identify challenges, and inform future disaster recovery initiatives | PSO - 3 | C               | C, P               | L                          | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|             | PSO 1 | PSO 2 | PSO 3 | PSO4 | PO 1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|-------------|-------|-------|-------|------|------|-----|-----|-----|-----|-----|-----|-----|
| <b>CO 1</b> | 3     | 1     | -     | -    | 3    | -   | -   | 2   | -   | -   | -   | -   |
| <b>CO 2</b> | -     | -     | -     | 3    | -    | -   | -   | 1   | 3   | -   | -   | -   |
| <b>CO 3</b> | 3     | 1     | -     | -    | 3    | -   | -   | 2   | -   | -   | -   | -   |
| <b>CO 4</b> | -     | -     | -     | 3    | -    | -   | -   | 1   | 3   | -   | -   | -   |
| <b>CO 5</b> | -     | 1     | 3     | -    | -    | -   | -   | -   | 1   | 3   | -   | -   |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Quiz | End Semester Examinations |
|------|---------------|------------|------|---------------------------|
| CO 1 | ✓             |            |      | ✓                         |
| CO 2 | ✓             |            |      | ✓                         |
| CO 3 | ✓             |            |      | ✓                         |
| CO 4 | ✓             | ✓          | ✓    | ✓                         |
| CO 5 | ✓             |            | ✓    |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK5DSEGGY304</b>  |                  |                   |                    |                  |
| Course Title   | <b>DISASTER RISK REDUCTION AND VULNERABILITY ANALYSIS</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | V  |                  |                   |                    |                  |
| Academic Level | 300-399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 4 hours          | -                 | -                  | 4                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | After completing the course, the learner will be able to acquire a basic understanding about techniques to reduce disaster risk. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                   | Content  | Hrs |
|------------|--|--|-----|
| <b>I</b>   | <b>BASICS OF DISASTER RISK</b>         |  | 12  |
|            | 1                                      | Disaster Risk: Definition; significance; Factors of disaster risk  |     |
|            | 2                                      | Disaster Risk Reduction (DRR): Basic Concepts - Objectives; Risk Analysis Techniques   |     |
|            | 3                                      | Vulnerability: Concept; Factors affecting Vulnerability  |     |
|            | 4                                      | Strategic Development for Vulnerability Reduction  |     |
| <b>II</b>  | <b>DISASTER RISK MANAGEMENT</b>        |  | 12  |
|            | 5                                      | Assessment of Disaster risk; Ways of minimizing disaster risk - Mitigation and Prevention  |     |
|            | 6                                      | Disaster Risk Management (DRM) Plan; Implementing DRM plan   |     |
|            | 7                                      | Role of Risk transfer and insurance in DRM   |     |
| <b>III</b> | <b>DISASTER RISK MITIGATION</b>        |  | 12  |
|            | 8                                      | Earthquake Risk mitigation; Flood Risk mitigation  |     |
|            | 9                                      | Cyclone risk mitigation; Coastal degradation   |     |
|            | 10                                     | Drought risk mitigation; Landslide Risk Mitigation   |     |
|            | 11                                     | Disaster Communication System - Early warning and its dissemination  |     |
|            | 12                                     | Structural and non-structural Mitigation of Disasters  |     |
| <b>IV</b>  | <b>DISASTER VULNERABILITY ANALYSIS</b> |  | 12  |
|            | 13                                     | Parameters of Disaster Vulnerability, Risk and Vulnerability Relationship, Observation and Perception of Vulnerability               |     |
|            | 14                                     | Vulnerability Identification, Socio-Economic Factors of Vulnerability, Vulnerability Analysis  |     |
|            |  | Methods of Disaster Vulnerability Analysis   |     |
| <b>V</b>   | <b>MAINSTREAMING CCA-DRR</b>           |  | 12  |
|            | 15                                     | Role and need of Climate Change Adaption-Disaster Risk Reduction integration; Options, Pathways and Mechanisms                       |     |
|            | 16                                     | Evolution of Yokohama Strategy, Hyogo Frame Work for Action, Sendai Framework for Disaster Risk Reduction, Integrated implementation |     |

|  |    |  |  |
|--|----|--|--|
|  | 17 | Natural Resource Management-Disaster Risk Management integration; Role of Green growth, REDD++ and sustainable NRM |  |
|--|----|--|--|

### References

- Coppola D P (2007) Introduction to International Disaster Management, Elsevier Science, London
- Birkland, Thomas (2006) Lessons of Disaster: Policy Change after Catastrophic Events, Washington, DC; Georgetown University Press
- White, Gilbert F and Eugene Hass J (1975) Assessment of Research on Natural Hazards, Cambridge, the MIT Press, MA
- Gupta A K, Niar S S and Chatterjee S (2013), Disaster Management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi
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### Web References

- <https://www.undrr.org/terminology/disaster-risk-reduction>
- <https://www.unep.org/explore-topics/climate-action/what-we-do/redd>
- <https://egyankosh.ac.in/bitstream/123456789/58953/1/Unit1.pdf>
- <https://niwa.co.nz/natural-hazards/hazards/risk-and-vulnerability>
- <https://www.ifrc.org/docs/idrl/i248en.pdf>

### Course Outcomes

| No.   | Upon completion of the course the graduate will be able to                           | Cognitive Level | PSO addressed |
|-------|--|-----------------|---------------|
| CO-1  | Develop a sound understanding of disaster risk and related factors and their impacts | R, U            | PSO - 1       |
| CO-2  | Apply science and technology for DRR   | Ap              | PSO - 3       |
| CO- 3 | Create awareness on various mitigation measures                                      | C               | PSO - 4       |
| CO- 4 | Evaluate the need for Yokohoma strategy  | E               | PSO - 3       |
| CO -5 | Analyse the role of the community in DRR   | An              | PSO - 3       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: DISASTER RISK REDUCTION AND VULNERABILITY ANALYSIS**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial(T) | Practical (P) |
|--------|----|--------|-----------------|--------------------|-------------------------|---------------|
|        |    |        |                 |                    |                         |               |

|       |  |         |      |   |   |   |
|-------|--|---------|------|---|---|---|
| CO-1  | Develop a sound understanding of disaster risk and related factors and their impacts | PSO - 1 | R, U | F | L | - |
| CO-2  | Apply science and technology for DRR   | PSO - 3 | Ap   | p | L | - |
| CO- 3 | Create awareness on various mitigation measures                                      | PSO - 4 | C    | P | L | - |
| CO- 4 | Evaluate the need for Yokohoma strategy  | PSO - 3 | E    | M | L | - |
| CO -5 | Analyse the role of the community in DRR   | PSO - 3 | An   | M | L | - |

**F-Factual, C- Conceptual, P-Procedural, M- Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | 2     | -     | -     | 1    | -    | -    | 2    | -    | -    |      |      |
| CO 2 | -     | -     | 2     | -     | -    | -    | -    | 2    | -    | 3    |      |      |
| CO 3 | -     | 1     | 2     | 3     | -    | -    | -    | -    | 2    | 2    |      |      |
| CO 4 | -     | 2     | 3     | -     | -    | -    | 2    | -    | -    | 1    |      |      |
| CO 5 | -     | 1     | 3     | 2     | -    | 3    | -    | -    | -    | 2    |      |      |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion / Seminar | End Semester Examinations |
|------|---------------|------------|----------------------|---------------------------|
| CO 1 | ✓             | ✓          |                      | ✓                         |
| CO 2 | ✓             |            | ✓                    | ✓                         |
| CO 3 | ✓             |            |                      | ✓                         |
| CO 4 |               | ✓          |                      | ✓                         |
| CO 5 |               |            | ✓                    |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK5DSEGGY305</b>   |                  |                   |                    |                  |
| Course Title   | <b>RURAL AND URBAN SETTLEMENT GEOGRAPHY</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>  |                  |                   |                    |                  |
| Semester       | V   |                  |                   |                    |                  |
| Academic Level | 300-399   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 4 hours          | -                 | -                  | 4                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | The course helps in acquiring a comprehensive understanding of human settlements, its origin and pattern, intricate links between human habitation and the environment which is crucial for planning, infrastructure development and resource allocation. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Introduction to Settlement Geography</b> |   | 12  |
|            | 1   | Settlement Geography - evolution, nature and scope; approaches to the study of settlement geography- genetic, regional, systematic and ecological   |     |
|            | 2   | Settlement types – rural and urban, characteristics and differences   |     |
|            | 3   | Factors influencing growth and distribution of settlements – environmental/physical, economic and traditional   |     |
|            | 4   | Importance of settlement studies in geography   |     |
| <b>II</b>  | <b>Study of Rural Settlements</b>           |   | 12  |
|            | 5   | Origin and growth of rural settlements - Site and situation of rural settlements  |     |
|            | 6   | Classification of rural settlements on the basis of Location – wet point site, dry point site ; Pattern - linear, circular, square, fan, net/reticulum, star/radial, arrow and terrace pattern  |     |
|            | 7   | Classification of rural settlements on the basis of Functions – agriculture, lumbering, fishing, mining ; Spacing – compact or nucleated, scattered or dispersed  |     |
| <b>III</b> | <b>Study of Urban Settlements</b>           |   | 12  |
|            | 8   | Origin and growth of urban settlements - Classification of urban settlements on the basis of Population – Town, City, Metropolitan city, Megalopolis, Conurbation; Location- Coastal, Nodal, Continental  |     |
|            | 9   | Classification of urban settlements on the basis of Pattern - Linear, Circular, Square, Fan, Net or Reticulum, Star or radial, Arrow ; Function- Industrial, Educational, Administrative, Regional, Tourism, Cultural, Commercial, Transformational |     |
|            | 10  | Hierarchy of urban Settlement: Rank size rule and Primate city  |     |



|           |                                |  |    |
|-----------|--------------------------------|--|----|
|           | 11                             | Rural-urban fringe – characteristics   |    |
| <b>IV</b> | <b>Urbanization</b>            |  | 12 |
|           | 12                             | Urbanisation – Definition, factors affecting urbanisation- Physical, Economical  |    |
|           | 13                             | Growth of world urbanization   |    |
|           | 14                             | Growth of Urbanisation - Indian context  |    |
|           | 15                             | Environmental issues in rural and urban settlements ; Problems of urbanisation   |    |
| <b>V</b>  | <b>Sustainable Development</b> |  | 12 |
|           | 16                             | Sustainable urban development, sustainable city/green city   |    |
|           | 17                             | Sustainable development of towns in India, management of basic services – water supply management, waste management, energy management |    |

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- <https://geographicbook.com/rural-settlements/>
- <https://planningtank.com/settlement-geography/rank-size-rule-by-george-zipf-1949>
- <https://planningtank.com/settlement-geography/rural-urban-fringe>
- <https://ourworldindata.org/urbanization>
- <https://www.undp.org/sustainable-development-goals>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the meaning of settlements, its nature,         | U               | PSO-1         |

|      |  |         |         |
|------|--|---------|---------|
|      | scope and the types, characteristics, and differences.                                     |         |         |
| CO-2 | Identify different factors that shaped the origin and growth of rural settlements.         | U, An   | PSO-1,2 |
| CO-3 | Analyse how different parameters contributed to urban settlement formation.                | U, A, E | PSO-1,3 |
| CO-4 | Evaluate the growth of urbanisation, understanding the problems of increasing urbanisation | U, E    | PSO-1,2 |
| CO-5 | Recognize the role of sustainable development in urban development                         | U, Ap   | PSO-2   |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: RURAL AND URBAN SETTLEMENT GEOGRAPHY**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/PS O | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the meaning of settlements, its nature, scope and the types, characteristics and differences. | PSO-1   | U               | F                  | L                        | -             |
| 2      | Identify different factors that shaped the origin and growth of rural settlements.                       | PSO-1,2 | U, An           | C                  | L                        | -             |
| 3      | Analyse how different parameters contributed to urban settlement formation.                              | PSO-1,3 | U, A, E         | P                  | L                        | -             |
| 4      | Evaluate the growth of urbanisation, understanding the problems of increasing urbanisation               | PSO-1,2 | U, E            | C                  | L                        | -             |
| 5      | Recognize the role of sustainable development in urban development                                       | PSO-2   | U, Ap           | M                  | L                        | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | 2     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 3 | 3     | -     | 2     | -     | -    | 3    | -    | -    | -    | -    | -    | -    |
| CO 4 | 3     | 3     | -     | -     | 2    | 3    | -    | -    | -    | -    | -    | -    |
| CO 5 | -     | 3     | -     | -     | -    | 3    | -    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          |            | ✓                         |
| CO 5 | ✓             | ✓          | ✓          |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK5DSEGGY306</b>   |                  |                   |                    |                  |
| Course Title   | <b>RURAL AND URBAN DEVELOPMENT THEORIES AND APPROACHES</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>  |                  |                   |                    |                  |
| Semester       | V   |                  |                   |                    |                  |
| Academic Level | 300-399   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 4 hours          | -                 | -                  | 4                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | This syllabus aims to provide a comprehensive understanding of rural and urban development theories and approaches, equipping students with the analytical tools necessary to critically evaluate and address the complexities of development in both rural and urban contexts. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit | Content  | Hrs |
|------------|------|--|-----|
| <b>I</b>   |      | <b>Introduction</b>  | 12  |
|            | 1    | Rural and urban area - definition, basic elements  |     |
|            | 2    | Rural and urban development – overview, key concepts   |     |
|            | 3    | Importance of rural and urban development  |     |
| <b>II</b>  |      | <b>Rural Development – Evolution</b>   | 12  |
|            | 4    | Rural development- historical evolution; philosophy of rural development - A.T. Masher, Mahatma Gandhi and Lenin’s- Experiments in Rural Development   |     |
|            | 5    | Approaches of Rural Development - Broad Front Approach - Sectoral Approach- Area Approach - Target Group Approach - Integrated/Holistic Approach   |     |
| <b>III</b> |      | <b>Rural Development- Strategies and Theories</b>  | 12  |
|            | 6    | Rural Development Strategies - Classification –Technical gap strategy - Resources-gap strategy - Organizational-gap strategy - Interdependence Strategy  |     |
|            | 7    | Rural Development Theories - The Modernization Theory, The Dependency Theory, Rosenstein-Rodan’s Theory , The Critical Minimum Effort Theory   |     |
|            | 8    | Institutional framework: Institutions for rural development, community development; DRDA; Local self-governments, district planning office; state planning boards; state rural development institutions; NIRD and SIRD |     |
| <b>IV</b>  |      | <b>Urban Development</b>   | 12  |
|            | 9    | Urbanisation - Definition and process, Hierarchy of cities- urban  |     |

|   |   |  |    |
|---|---|--|----|
|   |   | growth and system of cities, growth of metropolitan cities and mega cities , development of new towns, and small and medium town development.  |    |
|   | 10  | Approaches to urban development - Sustainable Urban Development, Inclusive Urban Development, Transit-Oriented Development (TOD), Place-Based Development, Resilient Urban Development, Participatory Urban Planning, Regenerative Urban Development |    |
|   | <b>Urban Development Theories and Pattern</b> |  |    |
| V | 11  | Theories of Urban Development – Concentric Zone Theory, Wedge or Radial Sector Theory and Multiple-Nuclei Theory, Central Place Theory, Theory of William Alonso on Location and Land use  | 12 |

## References

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- <https://www.researchgate.net/publication/367336288-Dependency-theory-strengths-weaknesses-and-its-relevance-today>
- <https://egyankosh.ac.in/bitstream/123456789/39117/1/Unit-2.pdf>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to  | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understand the basic concepts and the importance rural and urban area development   | U               | PSO-1         |
| CO-2 | Analyse the evolution of rural development and the approaches in the field  | An, U           | PSO-1         |
| CO-3 | Evaluate various strategies in rural development, interpret the theories regarding rural development and understand the role of different agencies. | Ap, R           | PSO-3         |
| CO-4 | Identify the process of urbanisation and various approaches in urban development  | U, E            | PSO-1         |
| CO-5 | Understand the theories in urban development and its application  | U, Ap           | PSO-1,2       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: RURAL AND URBAN DEVELOPMENT THEORIES AND APPROACHES**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|--------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the basic concepts and the importance rural and urban area development   | PSO-1  | U               | F                  | L                        | -             |
| 2      | Analyse the evolution of rural development and the approaches in the field  | PSO-1  | An, U           | F,C                | L                        | -             |
| 3      | Evaluate various strategies in rural development, interpret the theories regarding rural development and understand the role of different agencies. | PSO-3  | Ap, R           | C                  | L                        | -             |

|   |  |        |       |   |   |   |
|---|--|--------|-------|---|---|---|
| 4 | Identify the process of urbanisation and various approaches in urban development | PSO -1 | U, E  | P | L | - |
| 5 | Understand the theories in urban development and its application                 | PSO -1 | U, Ap | C | L | - |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PS O1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 2    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | -     | -     | -     | -    | 2    | -    | -    | -    | -    | -    | -    |
| CO 3 | -     | -     | 2     | -     | -    | 3    | -    | -    | -    | -    | -    | -    |
| CO 4 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 5 | 3     | -     | -     | -     | -    | 3    | -    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             | ✓          |            |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK5DSEGGY307</b>  |                  |                   |                    |                  |
| Course Title   | <b>GEOGRAPHY OF MIGRATION</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | V  |                  |                   |                    |                  |
| Academic Level | 300-399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2                  | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | The course focuses on the basic ideas of migration, migration theories, trend, pattern and gender dimensions of Kerala migration |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content   | Hrs |
|------------|--|---|-----|
| <b>I</b>   | <b>Introduction</b>                            |   | 10  |
|            | 1  | Migration- Definition - early and subsequent migration – scales of migration  |     |
|            | 2  | Types (Internal and International)  |     |
|            | 3  | Concept: refugee, brain-drain migration and Illegal migration.  |     |
|            | 4  | Contemporary Trends in migration  |     |
| <b>II</b>  | <b>Causes and Consequences</b>                 |   | 12  |
|            | 5  | Migration: Causes and consequence of migration in rural areas - Seasonal migration - Commuting patterns   |     |
|            | 6  | Determinants of internal migration: Causes of migration at the place of origin and at the place of destination.<br>Consequences of internal migration: demographic, economic, social and political consequences at the individual, household and community level. |     |
|            | 7  | International migration - Causes and Consequences   |     |
| <b>III</b> | <b>Theories of Migration</b>                   |   | 7   |
|            | 8  | Everett Lee's Theory of Migration   |     |
|            | 9  | Ravenstein's laws of migration  |     |
|            | 10   | Mobility Field Theory   |     |
| <b>IV</b>  | <b>Trends and Patterns of Kerala Migration</b> |   | 7   |
|            | 11   | Trend and pattern of Kerala Migration   |     |
|            | 12   | Gulf migration and its economic impact on Kerala  |     |
|            | 13   | Migrant labours in Kerala –possible causes-push and pull factors  |     |
| <b>V</b>   | <b>Gender Dimensions in Kerala Migration</b>   |   | 9   |
|            | 14   | Gender Dimensions in Kerala Migration   |     |
|            | 15   | Emigration of women domestic workers from Kerala: challenges and policy options   |     |



## PRACTICALS

(30 Hours)

**Exercise 1:** Socio-economic survey of Migrant labourers in local area.

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- <https://spb.kerala.gov.in/sites/default/files/inline-files/In-migrationEmploymnt.pdf>
- <https://www.un-ilibrary.org/content/journals/15644278/16/3/5/read>
- <https://core.ac.uk/pdf/aaa19918886.pdf>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to   | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the basic concepts, different forms of human migration, its characteristics, types and trend in migration | U               | PSO-1         |
| CO-2 | Analyse the various causes and consequences of migration   | An              | PSO-1,2       |
| CO-3 | Understand the various theories of migration   | U               | PSO-1         |
| CO-4 | Evaluation on trends and patterns of Kerala migration  | E               | PSO-1         |
| CO-5 | Analysis on gender dimensions in Kerala migration  | An              | PSO-1,2       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: GEOGRAPHY OF MIGRATION**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the basic concepts, different forms of human migration, its characteristics, types and trend in migration | PSO-1   | U               | F,C                | L                        | -             |
| 2      | Analyse the various causes and consequences of migration   | PSO-1,2 | An              | F                  | L                        | -             |
| 3      | Understand the various theories of migration   | PSO-1   | U               | C                  | L                        | -             |
| 4      | Evaluation on trends and patterns of Kerala migration  | PSO-1   | E               | F,M                | L                        | P             |
| 5      | Analysis on gender dimensions in Kerala migration  | PSO-1,2 | An              | M                  | L                        | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|             | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|-------------|------|------|------|------|-----|------|------|------|------|------|------|------|
| <b>CO 1</b> | 3    | -    | -    | -    | 3   | -    | -    | -    | -    | -    | -    | -    |
| <b>CO 2</b> | 2    | 2    | -    | -    | 3   | -    | -    | -    | -    | -    | -    | -    |
| <b>CO 3</b> | 3    | -    | -    | -    | 3   | -    | -    | -    | -    | -    | -    | -    |
| <b>CO 4</b> | 3    | -    | -    | -    | 3   | -    | -    | -    | -    | -    | -    | -    |
| <b>CO 5</b> | 2    | 2    | -    | -    | 3   | -    | -    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Quiz | End Semester Examinations |
|------|---------------|------------|------|---------------------------|
| CO 1 | ✓             | ✓          |      | ✓                         |
| CO 2 | ✓             |            | ✓    | ✓                         |
| CO 3 | ✓             |            |      | ✓                         |
| CO 4 | ✓             | ✓          | ✓    | ✓                         |
| CO 5 | ✓             |            |      |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK5DSEGGY308</b>   |                  |                   |                    |                  |
| Course Title   | <b>AGRICULTURAL GEOGRAPHY</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>  |                  |                   |                    |                  |
| Semester       | V   |                  |                   |                    |                  |
| Academic Level | 300-399   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 4                | -                 |                    | 4                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | Student will be able to identify the importance of agricultural activity and analyse the different natural and human components which affect the agriculture. It also explains evolution and agricultural types as well as assessment of models of crop yields. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Introduction</b>                                       |   | 12  |
|            | 1   | Definition, Nature Scope and of Agricultural Geography  |     |
|            | 2   | Significance of Agricultural Geography  |     |
|            | 3   | Evolution of Agriculture  |     |
|            | 4   | Elements of Agriculture (Land, Labour, Capital, and Market)   |     |
| <b>II</b>  | <b>Determinants and Types of Agriculture</b>              |   | 12  |
|            | 5   | Determinants of agriculture: Physical, Socio-economic, Institutional and Technological  |     |
|            | 6   | Agricultural Types: <ul style="list-style-type: none"> <li>• Shifting cultivation.</li> <li>• Intensive subsistent farming.</li> <li>• Mixed farming</li> <li>• Plantation agriculture</li> <li>• Commercial grain farming</li> </ul> |     |
| <b>III</b> | <b>Agricultural Location Theories and Regionalisation</b> |   | 12  |
|            | 7   | Von Thunen's Agricultural Location Model  |     |
|            | 8   | Sinclair's Theory   |     |
|            | 9   | Oloff Jonasson's Theory   |     |
|            | 10  | Agricultural regions of the world: Whittlesey's classification  |     |
|            | 11  | Agricultural regionalization: Delimitation of Agricultural Regions- Empirical-Single Element-Multi-element (statistical)-Quantitative-cum-qualitative technique   |     |
|            | 12  | ICAR's Classification of Agricultural Regionalization   |     |
| <b>IV</b>  | <b>Concepts and Modern Agricultural Methods</b>           |   | 12  |
|            | 13  | Crop Combination - Weaver's, Doi's, Raifullah's Methods   |     |
|            | 14  | Crop Diversification – Bhatia's Method  |     |

|          |  |  |    |
|----------|--|--|----|
|          | 15                                     | Agricultural productivity  |    |
|          | 16                                     | Modern Agricultural methods: Aeroponic, Aquaponics, Hydroponics, Monoculture   |    |
|          | <b>New Perspectives in Agriculture</b> |  |    |
| <b>V</b> | 17                                     | Food security and its components   | 12 |
|          | 18                                     | National Agricultural Policy of India; Minimum Support Price (MSP); Farmers Welfare Schemes  |    |
|          | 19                                     | Sustainable Agricultural Development and Poverty   |    |
|          | 20                                     | Remote sensing and Agriculture <ul style="list-style-type: none"> <li>• Crop production forecasting.</li> <li>• Assessment of crop damage and crop progress</li> <li>• Crop identification.</li> <li>• Crop yield modelling and estimation.</li> <li>• Soil moisture estimation</li> </ul> |    |

### References

- Bayliss Smith T P: The Ecology of Agricultural Systems, Cambridge University Press, London 1987.
- Gregor H P: Geography of Agriculture, Prentice Hall, New York, 1970.
- Garnier B J and Delobez A: Geography of Marketing, Longman, London, 1979.
- Grigg D B: Agricultural Systems of the World, Cambridge University Press, London, 1974.
- Lillesand T. M and Kiefer R. W, Remote sensing and Image Interpretation, John Wiley and Sons
- Roling, N.G., and Wageruters, M.A.E., (ed.) 1998: Facilitating Sustainable Agriculture, Cambridge University Press, Cambridge.
- Shafi, M., 2006: Agricultural Geography, Doring Kindersley India Pvt. Ltd., New Delhi
- Singh, J. (2003) Agricultural Geography. New Delhi: Oxford.
- Singh, J. and Dhillon, S.S. (1984) Agricultural Geography. New Delhi: Tata McGraw Hill
- Symons, L. (1967) Agricultural Geography. London: G. Bells

### Web References

- <https://www.geographyrealm.com/von-thunen-model-of-agricultural-land-use/>
- <https://pangeography.com/weavers-crop-combination-method/>
- [http://www.indiagri.in/admin/uploadpdf/991840Agriculture\\_Policy\\_Vision\\_2020.pdf](http://www.indiagri.in/admin/uploadpdf/991840Agriculture_Policy_Vision_2020.pdf)

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to         | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the nature and scope and basic elements of agricultural | U               | PO-1          |
| CO-2 | Evaluate the major determinants of agriculture                     | E               | PO-1,2        |
| CO-3 | Analyse the agricultural locations through various                 | An              | PO-1,3        |

|      |  |      |        |
|------|--|------|--------|
|      | location theories                          |      |        |
| CO-4 | Evaluate modern agricultural methods       | E    | PO-1,3 |
| Co-5 | Understand new perspectives in Agriculture | U,Ap | PO-1,3 |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: AGRICULTURAL GEOGRAPHY**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/PS O | Cognitive Level | Knowledge Category | Lecture (L) /Tutorial (T) | Practical (P) |
|--------|--|---------|-----------------|--------------------|---------------------------|---------------|
| 1      | Understand the nature and scope and basic elements of agricultural   | PO-1    | U               | C                  | L                         |               |
| 2      | Evaluate the major determinants of agriculture                       | PO-1,2  | E               | C,M                | L                         |               |
| 3      | Analyse the agricultural locations through various location theories | PO-1,3  | An              | C                  | L                         |               |
| 4      | Evaluate modern agricultural methods                                 | PO-1,3  | E               | C                  | L                         |               |
| 5      | Understand new perspectives in Agriculture                           | PO-1,3  | U,Ap            | F,M                | L                         |               |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | 1     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 3 | 3     | -     | 2     | -     | 3    | 1    | -    | -    | -    | -    | -    | -    |
| CO 4 | 2     | -     | 2     | -     | 2    | 1    | -    | -    | -    | -    | -    | -    |
| CO 5 | 2     | -     | 1     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          |            | ✓                         |
| CO 5 | ✓             | ✓          | ✓          |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK5SECGGY300</b>  |                  |                   |                    |                  |
| Course Title   | <b>INTRODUCTION TO GEO-SPATIAL TECHNOLOGY</b>  |                  |                   |                    |                  |
| Type of Course | <b>SEC</b>   |                  |                   |                    |                  |
| Semester       | V  |                  |                   |                    |                  |
| Academic Level | 300-399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 3  | 3 hours          | -                 | -                  | 3                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | The course highlights on a vast array of functionalities from spatial data analysis, Global Positioning System and application of Geo-spatial Technology |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content  | Hrs |
|------------|---|--|-----|
| <b>I</b>   | <b>Introduction to Geo-spatial Technology</b>                                 |  | 6   |
|            | 1   | Geo-spatial Technology: Meaning and Concept  |     |
|            | 2   | Evolution of Geo-spatial technology  |     |
|            | 3   | Remote Sensing: Meaning and types, Advantages, Applications  |     |
| <b>II</b>  | <b>Geographic Information System</b>  |  | 6   |
|            | 4   | GIS: Meaning and concept   |     |
|            | 5   | Components of GIS – Hardware, Software, Methods, Data, Users.  |     |
|            | 6   | Proprietary v/s Open Source Software Applications  |     |
| <b>III</b> | <b>Global Positioning System</b>  |  | 6   |
|            | 7   | Earth Positioning Systems : NAVSTAR, GLONASS, BEIDOU, NAVIC, GALILEO   |     |
|            | 8   | GPS Design & Objectives  |     |
|            | 9   | Components of GPS- Space Segment-Control Segment-User Segment  |     |
| <b>IV</b>  | <b>Geo-spatial Technology for Environmental Data Analysis</b>                 |  | 9   |
|            | 11  | Geo-spatial Technology for Geology: Mineral exploration, Geologic mapping, Hydrological analysis   |     |
|            | 12  | Geo-spatial Technology for mapping and Analysis of Bio-diversity/Forestry -Ecological sensitive zones and species diversity and species richness |     |
|            | 13  | Geo-spatial Technology for planetary sciences  |     |
| <b>V</b>   | <b>Geo-spatial Technology for Historical and Socio-economic data analysis</b> |  | 9   |
|            | 14  | Geo-spatial technology for archaeological studies  |     |
|            | 15  | GIS in Business : Market and Demographic Analysis, Transportation and Logistics, Facilities Management and Banking                               |     |



## Desirable Skill Enhancement Techniques

1. Field mapping using hand held GPS
2. Downloading geo-spatial data from online sources
3. Analysis of Disease spread, population trends, vegetation indices using FOSS
4. Preparing the layout of the campus using Mobile Mapping

## References

- Efraim.T, Rainer;R.K, Introduction to Information Technology, John Wiley & Sons.
- Haywood, Ian, Cornelius, Sarah & Carver, Steve (any edition), 'An Introduction to Geographical Information Systems', Prentice Hall, Pearson Education, U.K
- ch03\_s01 Canada Center for Remote Sensing, 'Fundamentals of Remote Sensing, Canada
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- De By, Rolf A 'Principles of Geographic Information Systems' ITC Educational Textbook Series, ITC, Netherlands, 2001

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- <https://www.ibm.com/topics/geographic-information-system>
- <https://www.space.com/gps-what-is-it>
- <https://www.educba.com/applications-of-gis/>

## Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                        | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | To understand general concepts of geo-spatial technology and remote sensing       | U               | PSO-1         |
| CO-2 | To understand general ideas of GIS  | U               | PSO-1         |
| CO-3 | To analyse the concept of GPS and its applications                                | An              | PSO-1,3       |
| CO-4 | To analyse geo-spatial technology for environmental data analysis                 | An              | PSO-1,3       |
| CO-5 | To analyse geo-spatial technology for historical and socio-economic data analysis | An              | PSO-1,3       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: INTRODUCTION TO GEO-SPATIAL TECHNOLOGY**

**Credits: 3:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1.     | To understand general concepts of geo-spatial technology and remote sensing       | PSO-1   | U               | C                  | L                        | P             |
| 2.     | To understand general ideas of GIS  | PSO-1   | U               | C                  | L                        |               |
| 3.     | To analyse the concept of GPS and its applications                                | PSO-1,3 | An              | C,M                | L                        | P             |
| 4.     | To analyse geo-spatial technology for environmental data analysis                 | PSO-1,3 | An              | C,M                | L                        |               |
| 5.     | To analyse geo-spatial technology for historical and socio-economic data analysis | PSO-1,3 | An              | C,M                | L                        | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 3 | 1     | -     | 2     | -     | 2    | -    | -    | -    | -    | 2    | -    | -    |
| CO 4 | 2     | -     | 1     | -     | 2    | 1    | -    | -    | -    | -    | -    | -    |
| CO 5 | 2     | -     | 1     | -     | 2    | 1    | -    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             | ✓          | ✓          |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK6DSCGGY300</b>   |                  |                   |                    |                  |
| Course Title   | <b>CARTOGRAPHY</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>  |                  |                   |                    |                  |
| Semester       | VI  |                  |                   |                    |                  |
| Academic Level | 300 - 399   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites | UK5DSCGGY300/UKSDSCGGY301/UK5DSCGGY302/UK5DSCGGY303/UK5DSCGGY304  |                  |                   |                    |                  |
| Course Summary | The course provides a general introduction to nature of Cartography and focuses upon the design and visualisation of maps and modern trends in Cartography. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Introduction to Cartography</b>                                    |   | 8   |
|            | 1   | Nature and scope – Cartography as art and science of Map making - Cartography as medium of human communication  |     |
|            | 2   | Maps – classification: Based on scale and purpose   |     |
|            | 3   | Map elements – Scales –R.F - Graphical scale - Verbal notation. Projection – Conformal projections - Equal area projections - Azimuthal projections. Coordinate systems – Cartesian coordinates - rectangular coordinates – UTM. Direction – True and Magnetic north. Conventional signs, symbols and colours |     |
|            | 4   | Earth as a cartographic problem – Spheroid – Ellipsoid and Geoid.   |     |
| <b>II</b>  | <b>Map: Compilation and Generalisation</b>                            |   | 7   |
|            | 5   | Spatial data – Sources of spatial data.   |     |
|            | 6   | Spatial dimensions of data – Point – Line - Area. Data – Discrete data – Continuous data – Smooth – Stepped. Levels of measurement – Nominal - Ordinal –Interval – Ratio.   |     |
|            | 7   | Map compilation - Compilation procedure – Analogue and digital compilation  |     |
|            | 8   | Generalizations of data – principles, elements and controls. Visual encoding of spatial data – Geometric and Mimetic symbols – qualitative and quantitative point, line, area symbolization   |     |
| <b>III</b> | <b>Data to Visualization: Designing Layout and Production of Maps</b> |   | 10  |
|            | 9   | Principles of Map design – Design process – Theory of visual perception   |     |
|            | 10  | Graphic elements and visual variables in map design - Controls on map design  |     |
|            | 11  | Typography and lettering – Elements of typographic design –   |     |

|           |  |  |    |
|-----------|--|--|----|
|           |  | positioning and methods of lettering.  |    |
|           | 12                                     | Map production process: Clip art maps- Database mapping – Desktop publishing |    |
| <b>IV</b> | <b>Modern Trends in Cartography</b>    |  | 11 |
|           | 13                                     | Thematic cartography – Multivariate and cross variate mapping techniques     |    |
|           | 14                                     | Dynamic and interactive mapping – Animation - Simulation - Web mapping       |    |
| <b>V</b>  | <b>Toposheets: Critical Assessment</b> |  | 9  |
|           | 15                                     | Cartographic appreciation of Survey of India toposheets.                     |    |

## PRACTICALS

(30 hours)

**Exercise 1:** Construction of Zenithal projections: Gnomonic, Stereographic and Orthographic.

**Exercise 2:** Construction of Conical projections: Conical projection with one standard parallel, Conical projection with two standard parallel, Bonne’s projection and Polyconic projection

**Exercise 3:** Construction of Cylindrical projections: Simple cylindrical projection, Equal area projection and Mercator’s projection

**Exercise 4:** Field Surveying : Chain and tape survey, Plane Table, Prismatic compass, Indian Clinometer, Dumpy Level (**Any 3**)

## References

- Arthur H Robinson (1995), Elements of cartography, 6th edition. John Wiley (Asia) Pte Ltd. ISBN: 9-814-12638-1
- R.P Misra & A. Ramesh (1989), Fundamentals of cartography, Concept publishing company, New Delhi. ISBN:81-7022-148-X
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- Jawahar Lal Jain (2023), Fundamentals of cartography and Geoinformatics, Atlantic Publishers and Distributors Pvt Ltd.ISBN: 978-8126935710
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- <https://www.e-education.psu.edu/geog486/>
- <https://www.esri.com/arcgis-blog/products/arcgis-pro/mapping/design-principles-for-cartographers/>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to         | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the scientific and artistic blending cartography        | R, U            | PSO-1         |
| CO-2 | Understand and apply the various map elements while doing mapping  | U, Ap           | PSO-1, 3      |
| CO-3 | Able to construct Map projections and different types of scales.   | Ap              | PSO-3         |
| CO-4 | Understand and apply the design concepts in map making.            | U, Ap           | PSO-3         |
| CO-5 | Understand the various mapping techniques in thematic cartography. | U               | PSO-1         |
| CO-6 | Critically analyse the ethical aspects of cartography              | Ap              | PSO-4         |
| CO-7 | Able to evaluate the cartographic quality of SOI toposheets        | E               | PSO-1         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: CARTOGRAPHY**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/P SO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|----------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the scientific and artistic blending cartography       | PSO -1   | R, U            | F                  | L                        |               |
| 2      | Understand and apply the various map elements while doing mapping | PSO -1,3 | U, Ap           | F                  | L                        |               |
| 3      | Able to construct Map projections and different types of scales.  | PSO -3   | Ap              | C                  | L                        | P             |
| 4      | Understand and apply the design concepts in map making.           | PSO -3   | U, Ap           | C                  | L                        |               |

|   |  |           |    |   |   |  |
|---|--|-----------|----|---|---|--|
| 5 | Understand the various mapping techniques in thematic cartography. | PSO<br>-1 | U  | C | L |  |
| 6 | Critically analyse the ethical aspects of cartography              | PSO<br>-4 | Ap | M | L |  |
| 7 | Able to evaluate the cartographic quality of SOI toposheets        | PSO<br>-1 | E  | M | L |  |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO<br>1 | PSO<br>2 | PSO<br>3 | PSO<br>4 | PO<br>1 | PO<br>2 | PO<br>3 | PO<br>4 | PO<br>5 | PO<br>6 | PO<br>7 | PO<br>8 |
|------|----------|----------|----------|----------|---------|---------|---------|---------|---------|---------|---------|---------|
| CO 1 | 3        | -        | -        | -        | 3       | -       | -       | -       | -       | -       | -       | -       |
| CO 2 | 3        | -        | 3        | -        | 3       | -       | 3       | -       | -       | -       | -       | -       |
| CO 3 | -        | -        | 3        | -        | -       | -       | -       | -       | -       | -3      | -       | -       |
| CO 4 | -        | -        | 3        | -        | -       | -       | -       | -       | -       | 3       | -       | -       |
| CO 5 | 3        | -        | -        | -        | -       | -       | -       | 2       | -       | -       | -       | -       |
| CO 6 | -        | -        | -        | 3        | -       | -       | -       | -       | -       | -       | -       | 3       |
| CO7  | 3        | -        | -        | -        | 3       | -       | -       | -       | -       | -       | 1       | -       |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            | ✓          | ✓                         |
| CO 3 | ✓             |            | ✓          | ✓                         |
| CO 4 | ✓             | ✓          |            | ✓                         |
| CO 5 | ✓             | ✓          |            | ✓                         |
| CO 6 | ✓             |            |            | ✓                         |
| CO7  | ✓             |            |            |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK6DSCGGY301</b>   |                  |                   |                    |                  |
| Course Title   | <b>GEOGRAPHY OF KERALA</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>  |                  |                   |                    |                  |
| Semester       | VI  |                  |                   |                    |                  |
| Academic Level | 300 - 399   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2                  | 5                |
| Pre-requisites | UK5DSCGGY300/UKSDSCGGY301/UK5DSCGGY302/UK5DSCGGY303/UK5DSCGGY304  |                  |                   |                    |                  |
| Course Summary | The course provides a comprehensive knowledge of physical, cultural and economic settings and related issues in Kerala. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                       | Content  | Hrs |
|------------|--|--|-----|
| <b>I</b>   | <b>Physical Settings of Kerala</b>         |  | 9   |
|            | 1  | Location - Physiography  |     |
|            | 2  | Climate – Seasons -Annual rainfall- Seasonal Rainfall - Variability of rainfall – Features and effects of monsoon. |     |
|            | 3  | Soil: types  |     |
|            | 4  | Drainage: East and West flowing rivers- Backwaters and lakes   |     |
| <b>II</b>  | <b>Agriculture and Irrigation</b>          |  | 9   |
|            | 6  | Agriculture – Spatial distribution : Rice, Coconut, Rubber, Tea, Coffee, Pepper and Cardamom                       |     |
|            | 7  | Agro - Climatic Zones of Kerala  |     |
|            | 8  | Irrigation: Characteristics, Major Irrigation Projects in Kerala   |     |
| <b>III</b> | <b>Resources and Industries</b>            |  | 11  |
|            | 10   | Mineral Resources – Occurrence and distribution of rare earths   |     |
|            | 11   | Power Resources – Capacity and production of major Hydroelectric, Thermal, Solar and Wind energy projects          |     |
|            | 12   | Marine Resources – Fisheries: Significance and Production  |     |
|            | 13   | Industries in Kerala: - Major Industries - Cottage and Small Scale Industries                                      |     |
|            | 14   | Technology Parks in Kerala   |     |
|            | 15   | Tourism Industry – Potentialities – Major Eco-tourism centres  |     |
| 16         | Problems and Prospects of Tourism Industry |  |     |
| <b>IV</b>  | <b>Population</b>                          |  | 7   |
|            | 17   | Distribution and Growth of Population, Density, Sex-ratio  |     |
|            | 18   | Patterns of Migration in Kerala: Current trends of migration in Kerala   |     |
|            | 19   | Trend of Urbanization – Major Urbanization Problems  |     |



|   |                                 |  |   |
|---|---------------------------------|--|---|
|   | 20                              | Kerala Model of Development  |   |
| V | <b>Transportation and Trade</b> |  | 9 |
|   | 21                              | Roads, Railways, Waterways , Airways and Ports<br>Pattern and Current flows of Trade |   |

## PRACTICALS

(30 Hours)

### Practical based on the Topographic map of Kerala

**Exercise 1:** Calculation of average Slope - Wentworth's Method

**Exercise 2:** Delineation of Basins – Subdivisions - Stream Ordering - Strahler's and Horton's Methods Bifurcation Ratio - Drainage Density

**Exercise 3:** Profiles - Simple, Superimposed, Composite, and Projected

### References

- Geography of Kerala - Dr. Srikumar Chattopadhyay
- Geography of Kerala – Dr. George Kurian.
- Economy of Kerala - Karunakaran and Sankaranarayanan
- Geomorphology of Kerala - V. Prasannakumar
- Striving for Sustainability: Environmental Stress and Democratic Initiatives in Kerala , Dr. Srikumar Chattopadhyay, Richard W Franke
- Gazetteer of Kerala - Kerala Gazetteer, Govt. of Kerala
- Water Atlas of Kerala - CWRDM, Kozhikode
- Resource Atlas of Kerala - Centre for Earth Science Studies
- District Census Handbooks - Directorate of Census Operations – Kerala

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- <https://www.spb.kerala.gov.in/economic-review>
- <https://www.census2011.co.in/census/state/kerala.html>

### Course Outcomes

| No.  | Upon Completion of the Course he Graduate Will Be Able To                  | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Provides a comprehensive understanding on physiographic settings of Kerala | R,U             | PSO-1         |
| CO-2 | Appreciate Agricultural development of Kerala                              | R, U            | PSO-1         |
| CO-3 | Evaluate resources and industries and analysis on tourism in Kerala        | E,An            | PSO-1,2       |
| CO-4 | Analyze population characteristics of the state                            | U,An            | PSO-1,2       |
| CO-5 | Understanding transportation networks of Kerala                            | U               | PSO-1         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: GEOGRAPHY OF KERALA**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| <b>CO No.</b> | <b>CO</b>  | <b>PO/PSO</b> | <b>Cognitive Level</b> | <b>Knowledge Category</b> | <b>Lecture (L) /Tutorial (T)</b> | <b>Practical (P)</b> |
|---------------|--|---------------|------------------------|---------------------------|----------------------------------|----------------------|
| 1             | Provides a comprehensive understanding on physiographic settings of Kerala | PSO-1         | R,U                    | F                         | L                                | P                    |
| 2             | Appreciate Agricultural development of Kerala                              | PSO-1         | R, U                   | C                         | L                                | -                    |
| 3             | Evaluate resources and industries and analysis on tourism in Kerala        | PSO-1, 2      | E ,An                  | M                         | L                                | -                    |
| 4             | Analyse the Population characteristics of the state                        | PSO-1, 2      | U, An                  | F                         | L                                | -                    |
| 5             | Understanding transportation networks of Kerala                            | PSO-1         | U                      | M                         | L                                | -                    |

**Mapping of COs with PSOs and POs:**

|             | <b>PSO1</b> | <b>PSO2</b> | <b>PSO3</b> | <b>PSO4</b> | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> | <b>PO6</b> | <b>PO7</b> | <b>PO8</b> |
|-------------|-------------|-------------|-------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>CO 1</b> | 3           | -           | -           | -           | 1          | 2          | -          | -          | -          | -          | -          | -          |
| <b>CO 2</b> | 3           | -           | -           | -           | 2          | -          | -          | -          | -          | -          | -          | -          |
| <b>CO 3</b> | 3           | 3           | -           | -           | 3          | 2          | -          | -          | -          | -          | -          | -          |
| <b>CO 4</b> | 3           | 3           | -           | -           | 2          | -          | -          | -          | -          | -          | -          | -          |
| <b>CO 5</b> | 3           | -           | -           | -           | 2          | -          | -          | -          | -          | -          | -          | -          |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Quiz | End Semester Examinations |
|------|---------------|------------|------|---------------------------|
| CO 1 | ✓             | ✓          | ✓    | ✓                         |
| CO 2 | ✓             |            | ✓    | ✓                         |
| CO 3 | ✓             |            | ✓    | ✓                         |
| CO 4 | ✓             | ✓          | ✓    | ✓                         |
| CO 5 | ✓             |            |      |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK6DSCGGY302</b>   |                  |                   |                    |                  |
| Course Title   | <b>WORLD REGIONAL GEOGRAPHY</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>  |                  |                   |                    |                  |
| Semester       | VI  |                  |                   |                    |                  |
| Academic Level | 300 - 399   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 4 hours          | -                 | -                  | 4                |
| Pre-requisites | UK5DSCGGY300/UKSDSCGGY301/UK5DSCGGY302/<br>UK5DSCGGY303/UK5DSCGGY304  |                  |                   |                    |                  |
| Course Summary | The course introduces world geographic regions and the political, economic and cultural characteristic that make them distinct from each other. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content   | Hrs |
|------------|--|---|-----|
| <b>I</b>   | <b>Concept of a region</b>   |   | 12  |
|            | 1  | Concept of a region : Attributes  |     |
|            | 2  | Types – Naively given region, Instituted regions, Formal region – natural region, socio cultural region, Functional regions, Planning regions |     |
|            | 3  | Methods of regionalization  |     |
| <b>II</b>  | <b>Major Tropical and subtropical Natural Regions of the World</b> |   | 12  |
|            | 4  | Physical, Cultural, Economic and Major developments– Equatorial rainforest, Tropical Savannah, Hot deserts, Mediterranean. rainforest,        |     |
| <b>III</b> | <b>Major Temperate and Frigid Natural Regions of the World</b>     |   | 12  |
|            | 5  | Physical, Cultural, Economic and Major developments- Temperate grasslands, Taiga, Tundra.   |     |
| <b>IV</b>  | <b>World Distribution of Major Landforms and Water Bodies</b>      |   | 12  |
|            | 6  | World Distribution of Mountains, Plains, Plateaus, Lakes and rivers – Their influence on man.   |     |
| <b>V</b>   | <b>Modification in Environment due to Human Interference</b>       |   | 12  |
|            | 7  | Land degradation in Amazon basin.   |     |
|            | 8  | Global warming in Artic, Antarctic, African Savannah and Tropical ever green forest.  |     |
|            | 9  | A case study on Land degradation in local areas.  |     |

**References**

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- Johnson, Haarmann, Clawson (2010) World Regional Geography, Prentice Hall.

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- <https://www.ipcc.ch/report/ar6/wg2/chapter/ccp6/>
- <https://www.google.com/amp/s/data-flair.training/blogs/major-natural-regions-of-the-world/amp/>
- <https://www.frontiersin.org/articles/>

#### **Course Outcomes**

| No.  | Upon completion of the course the graduate will be able to                                     | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the concept of a region and classify methods of delineation of regions              | U               | PSO-1         |
| CO-2 | Identifies major Natural Regions and differentiate their physical and economic Characteristics | R, U            | PSO-1,2       |
| CO-3 | Analysis on major landforms and water bodies on world.   | An              | PSO-1,2       |
| CO-4 | Evaluate the major threats in natural regions of the world.                                    | E               | PSO-1,2       |
| CO-5 | Analyse the land degradation in local areas.   | An              | PSO-1,3       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: WORLD REGIONAL GEOGRAPHY**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO   | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the concept of a region and classify methods of delineation of regions              | PSO-1   | U               | F                  | L                        | -             |
| 2      | Identifies major Natural Regions and differentiate their physical and economic Characteristics | PSO-1,2 | R, U            | C                  | L                        | -             |
| 3      | Analysis on major landforms and water bodies on world.   | PSO-1,2 | An              | M                  | L                        | -             |
| 4      | Evaluate the major threats in natural regions of the world.                                    | PSO-1,2 | E               | F                  | L                        | -             |
| 5      | Analyse the land degradation in local areas.   | PSO-1,3 | An              | M                  | L                        | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|      | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 2 | 3    | 2    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 3 | 3    | 1-   | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 4 | 2    | 2    | -    | -    | 2   | 1   | -   | -   | -   | -   | -   | -   |
| CO 5 | 1    | -    | 2    | -    | 2   | -   | 1   | -   | -   | -   | -   | -   |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             |            | ✓          | ✓                         |
| CO 3 | ✓             |            | ✓          | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             |            |            |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK6DSCGGY303</b>  |                  |                   |                    |                  |
| Course Title   | <b>ECONOMIC GEOGRAPHY</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | VI   |                  |                   |                    |                  |
| Academic Level | 300-399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 4                | -                 | -                  | 4                |
| Pre-requisites | UK5DSCGGY300/UKSDSCGGY301/UK5DSCGGY302/<br>UK5DSCGGY303/UK5DSCGGY304   |                  |                   |                    |                  |
| Course Summary | The course provides an over view of major primary, secondary, tertiary, quaternary and quinary economic activities of the world, transport system and trade pattern. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                      | Content  | Hrs |
|------------|---|--|-----|
| <b>I</b>   | <b>Fundamentals of Economic Geography</b> |  | 12  |
|            | 1   | Economic Geography-Evolution   |     |
|            | 2   | Definition- Nature-Scope   |     |
|            | 3   | Concept and classification of economic activities.   |     |
| <b>II</b>  | <b>Primary Economic Activities</b>        |  | 12  |
|            | 4   | Agriculture- Meaning and Types   |     |
|            | 5   | Distribution of Iron ore-Mica-Coal-Petroleum   |     |
|            | 6   | Major fishing grounds in the world.  |     |
| <b>III</b> | <b>Secondary Economic Activities</b>      |  | 12  |
|            | 7   | Locational factors of Industries   |     |
|            | 8   | Agro- based Industries-Distribution and production of cotton textile industry-jute textile industry  |     |
|            | 9   | Mineral based industries-Distribution and production of iron and steel industry  |     |
|            | 10  | Industrial regions: Eastern Asia, Western and Central Europe, Eastern North America  |     |
| <b>IV</b>  | <b>Tertiary Economic Activities</b>       |  | 12  |
|            | 11  | Transport: Land transport: Roads: Trans Canadian Highway, Pan American Highway, Railway: Trans-continental railway, Water transport: Panama canal, Suez canal route, North Atlantic route-Air transport-Types of ports |     |
|            | 12  | International trade: Impact of Globalization on International Trade -Trade Blocs-W.T.O-E.U-ASEAN-OPEC.   |     |
| <b>V</b>   | <b>Quaternary and Quinary Activities</b>  |  | 12  |
|            | 13  | Meaning of Quaternary and Quinary Activities-IT Industry   |     |
|            | 14  | Software technology parks - SEZ, Multinational companies   |     |



## References

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- [https://european-union.europa.eu/index\\_en](https://european-union.europa.eu/index_en)

## Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                                       | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the evolution, nature and scope of Economic Geography.                                | U               | PSO-1         |
| CO-2 | Acquire an understanding regarding primary economic activities in the world.                     | R, U            | PSO-1, 2      |
| CO-3 | Analyse the secondary economic activities in the word  | An              | PSO-1, 2, 3   |
| CO-4 | Assess the transport systems, trade blocs and how globalization changed the world trade pattern. | E,U             | PSO-2, 3, 4   |
| CO-5 | Acquire knowledge regarding the higher level economic activities.                                | R, U            | PSO-2, 4      |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: ECONOMIC GEOGRAPHY**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/PSO   | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|----------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the evolution, nature and scope of Economic Geography.                                | PSO-1    | U               | C                  | L                        | -             |
| 2      | Acquire an understanding regarding primary economic activities in the world.                     | PSO-1    | R, U            | F                  | L                        | -             |
| 3      | Analyse the secondary economic activities in the world   | PSO-1, 3 | An              | F                  | L                        | -             |
| 4      | Assess the transport systems, trade blocs and how globalization changed the world trade pattern. | PSO-3, 4 | E,U             | M                  | L                        | -             |
| 5      | Acquire knowledge regarding the higher level economic activities.                                | PSO-4    | R, U            | M                  | L                        | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | 3    | -    | -    | -    | 2   | -   | -   | -   | -   | -   | -   | -   |
| CO 2 | 3    | 3    | -    | -    | 2   | -   | -   | -   | -   | -   | -   | -   |
| CO 3 | 2    | 2    | 2    | -    | 2   | -   | -   | -   | -   | -   | -   | -   |
| CO 4 | -    | 3    | 3    | 3    | 2   | 2   | -   | -   | -   | -   | -   | 2   |
| CO 5 | -    | 2    | -    | 2    | 2   | 2   | -   | -   | -   | -   | -   | 2   |

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             |            | ✓          | ✓                         |
| CO 3 | ✓             |            | ✓          | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             |            |            |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK6DSEGGY300</b>  |                  |                   |                    |                  |
| Course Title   | <b>GLOBAL POSITIONING SYSTEM</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | VI   |                  |                   |                    |                  |
| Academic Level | 300-399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | This course focus on the concepts of Space and location, Modern techniques assisting navigation, basics of geodesy, components of GPS and other Earth positioning systems and their applications |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content  | Hrs |
|------------|--|--|-----|
| <b>I</b>   | <b>Introduction to Earth Positioning Systems</b> |  | 10  |
|            | 1  | Introduction to GPS : History and Development- Kepler's Law - Doppler effect -Positioning concept -Transit, Timation   |     |
|            | 2  | Earth Positioning Systems : NavIC, Glonass, Galileo,Beidou   |     |
|            | 3  | Advantages and Limitations of GPS  |     |
| <b>II</b>  | <b>Fundamentals of Geodesy</b>                   |  | 10  |
|            | 4  | Basic Geodesy: Geoid /datum/ Ellipsoid-Definition and basic concepts, Spatial Referencing system, Map Scale, Scale factors                                     |     |
|            | 5  | Land Surveying : Classification -Topographic Surveying and Mapping - Triangulation - Traversing - Benchmarks -Contouring                                       |     |
| <b>III</b> | <b>Components of GPS</b>                         |  | 10  |
|            | 6  | GPS Design & Objectives : Components of GPS- Space Segment- Control Segment-User Segment   |     |
|            | 7  | Satellite Configuration-Orbit determination-GPS Error and Accuracy   |     |
|            | 8  | GPS Signal Structure and Characteristics : Structure of GPS Signal, Frequency, P Code, C/A code and data format - Generation of C/A code -Navigation data bits |     |
|            | 9  | GPS receiver: Types and Structure of receivers, Principles of GPS position fixing- Pseudo Ranging  |     |
| <b>IV</b>  | <b>GPS Survey Methods and Data Processing</b>    |  | 10  |
|            | 10   | GPS Survey Methods: Single Point or Point Vs. Relative, Static Vs. Kinematic, Real time Vs. Post mission.  |     |
|            | 11   | GPS Survey field procedures: Code and Carrier-based positioning, Accuracy and recording time   |     |
|            | 12   | GPS Data Processing : Ambiguity resolution-Post processing-Real time processing-Accuracy measures-Software modules   |     |
|            | 13   | GPS and Geographic Information System integration  |     |

| V | Applications of GPS |   | 5 |
|---|---------------------|---|---|
|   | 14                  | Applications of GPS: GPS in Natural Resource Management, GPS in Surveying and Mapping, GPS in Navigation    |   |
|   | 15                  | GPS Application in Agriculture, GPS Application in Military Operations, GPS in Urban Utilities and Services |   |

## PRACTICALS

(30 Hours)

**Exercise 1:** Using GPS with map & compass

**Exercise 2:** Area calculation by GPS

**Exercise 3:** Navigation by way points, track points

**Exercise 4:** Transfer of Way points, track points

**Exercise 5:** Map preparation

(Field Work: Exercises 1-4)

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- <https://serc.carleton.edu>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                     | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Discuss Concept, History of Earth Positioning System                           | U               | PSO-1         |
| CO-2 | Classify Land and Differential Survey methods                                  | Ap              | PSO-3         |
| CO-3 | Comprehend various segments of GPS system                                      | U               | PSO-1         |
| CO-4 | Implement suitable techniques of GPS survey<br>Develop GPS and GIS integration | Ap,<br>C        | PSO-3         |
| CO-5 | Apply GPS technology in various fields   | Ap              | PSO-3         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: GLOBAL POSITIONING SYSTEM**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO   | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/ Tutorial (T) | Practical (P) |
|--------|--|--------|-----------------|--------------------|---------------------------|---------------|
| 1      | Discuss Concept, History of Earth Positioning System                           | PSO-1  | F               | U                  | L                         | -             |
| 2      | Classify Land and Differential Survey methods                                  | PSO-3  | P               | Ap                 | L                         | -             |
| 3      | Comprehend various segments of GPS system                                      | PSO-1  | C               | U                  | L                         | -             |
| 4      | Implement suitable techniques of GPS survey<br>Develop GPS and GIS integration | PSO-3  | M               | Ap,<br>C           | -                         | P             |
| 5      | Apply GPS technology in various fields   | PSO-3  | M               | Ap                 | -                         | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | 3    | -    | 3    | 3    | -    |
| CO 2 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 3 | 3     | -     | -     | -     | 3    | -    | -    | 3    | -    | 3    | 3    | -    |
| CO 4 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 5 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |

**Assessment Rubrics:**

- Quiz/Assignment/Discussion/ Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Project Evaluation | End Semester Examinations |
|------|---------------|------------|--------------------|---------------------------|
| CO 1 | ✓             | ✓          |                    | ✓                         |
| CO 2 | ✓             |            |                    | ✓                         |
| CO 3 | ✓             |            |                    | ✓                         |
| CO 4 | ✓             | ✓          |                    | ✓                         |
| CO 5 |               |            |                    |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK6DSEGGY301</b>   |                  |                   |                    |                  |
| Course Title   | <b>REMOTE SENSING AND GIS IN LAND USE ANALYSIS</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>  |                  |                   |                    |                  |
| Semester       | VI  |                  |                   |                    |                  |
| Academic Level | 300-399   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | This course focus on applications of Remote Sensing and GIS in Land Evaluation studies with special reference to Agriculture, Soil and Land Degradation |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content   | Hrs       |
|------------|--|---|-----------|
| <b>I</b>   | <b>Introduction to RS and GIS in Agriculture</b> |   | <b>10</b> |
|            | 1  | Overview of Remote sensing techniques and GIS in agriculture                                      |           |
|            | 2  | Spectral Reflectance and characteristics of crops: Factors affecting spectral signatures of crops |           |
|            | 3  | Crop identification: Principles and crop acreage estimation                                       |           |
|            | 4  | Remote Sensing Technique in Crop Yield Modelling  |           |
| <b>II</b>  | <b>Agro meteorology through Remote Sensing</b>   |   | <b>10</b> |
|            | 5  | Crop condition and stress assessment using RS techniques  |           |
|            | 6  | Crop inventory: Methods of RS and GIS Techniques  |           |
|            | 7  | Significance of RS Agro meteorology: Methods and Applications                                     |           |
| <b>III</b> | <b>RS and GIS in Soil Studies</b>                |   | <b>10</b> |
|            | 8  | Soil morphology: Pedogenesis, Soil Horizons, Soil Texture   |           |
|            | 9  | Distribution of Soil types in India: An Overview  |           |
|            | 10   | Wastelands: Mapping and management using Remote sensing   |           |
|            | 11   | Soil moisture assessment using RS: Application of SAR data  |           |
|            | 12   | Soil erosion and erosion hazard assessment through Remote sensing                                 |           |
| <b>IV</b>  | <b>RS and GIS in Land Evaluation</b>             |   | <b>10</b> |
|            | 13   | Land use / Land cover: Basic concept and classification   |           |
|            | 14   | Land use / Land cover mapping through Remote sensing and GIS                                      |           |
|            | 15   | Land Degradation: Degraded Soils, Identification, and mapping of Degraded lands                   |           |
| <b>V</b>   | <b>RS and GIS in Snow Cover Mapping</b>          |   | <b>5</b>  |
|            | 16   | Geography of Extreme climates: Tropical Deserts and Alpine Climate                                |           |
|            | 17   | Snow Cover Monitoring: Significance in Global Climate   |           |
|            | 18   | Satellite Snow Cover Mapping: Missions and Sensors  |           |



## PRACTICAL

(30 Hours)

**Exercise 1:** Crop Yield estimation

**Exercise 2:** Soil Moisture Assessment

**Exercise 3:** Land Degradation mapping

**Exercise 4:** Landscape Ecology Analysis

**Exercise 5:** Estimation of the pH of soils (Field Work)

## References

- Anji Reddy, M. 2004: Geoinformatics for Environmental Management. B.S. Publications
- Jensen, J.R. 2000: Remote Sensing of the Environment: An Earth resource Perspective. Prentice Hall
- Lillesand, T.M., and Kieffer, R.M., 1987: Remote Sensing and Image Interpretation, John Wiley.
- Skidmore A. 2002: Environmental Modeling with GIS and Remote Sensing. Taylor and Francis

## Web References

- <https://onlinecourses.nptel.ac.in>
- <https://www.ncbi.nlm.nih.gov>
- <https://www.nrsc.gov.in>
- <https://natural-resources.canada.ca>
- <https://gisresources.com>
- <https://earthobservatory.nasa.gov>

## Course Outcomes

| No.  | Upon completion of the course the graduate will be able to | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Recall applications of GIS and RS in agriculture           | R               | PSO-1         |
| CO-2 | Employ GIS and RS techniques in Agro meteorology           | Ap              | PSO-3         |
| CO-3 | Examine Soil moisture and erosion using GIS and RS         | An              | PSO-3         |
| CO-4 | Evaluate Land use/Land cover and Land Degradation          | E               | PSO-3         |
| CO-5 | Appraise RS & GIS technology in Snow cover mapping         | E               | PSO-3         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: REMOTE SENSING AND GIS IN LAND USE ANALYSIS**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|--------|-----------------|--------------------|--------------------------|---------------|
| 1      | Recall applications of GIS and RS in agriculture   | PSO-1  | R               | P                  | L                        | -             |
| 2      | Employ GIS and RS techniques in Agro meteorology   | PSO-3  | Ap              | M                  | L                        | -             |
| 3      | Examine Soil moisture and erosion using GIS and RS | PSO-3  | An              | P                  | L                        | -             |
| 4      | Evaluate Land use/Land cover and Land Degradation  | PSO-3  | E               | M                  | -                        | P             |
| 5      | Appraise RS & GIS technology in Snow cover mapping | PSO-3  | E               | C                  | -                        | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | 3    | -    | -    | -    | -    |
| CO 2 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 3 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 4 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 5 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 |               |            | ✓          |                           |



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|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK6DSEGGY302</b>  |                  |                   |                    |                  |
| Course Title   | <b>REMOTE SENSING AND GIS IN WATER RESOURCE MANAGEMENT</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | VI   |                  |                   |                    |                  |
| Academic Level | 300-399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | This course aims to focus on applications of GIS and Remote Sensing techniques in delineation, conservation, and management Water Resources. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content   | Hrs       |
|------------|---|---|-----------|
| <b>I</b>   | <b>Introduction to Water Resources</b>            |   | <b>10</b> |
|            | 1   | Introduction to Water Resources: Meaning and Basic Concepts   |           |
|            | 2   | Hydrological cycle-Darcy's law- Porosity, Permeability, Transmissibility  |           |
|            | 3   | Specific yield, Specific retention, and Hydraulic conductivity  |           |
|            | 4   | Spectral characteristics of water: Spectral Signature profile   |           |
| <b>II</b>  | <b>Remote sensing in Ground Water exploration</b> |   | <b>10</b> |
|            | 5   | Ground Water Resources: Definition, Characteristics   |           |
|            | 6   | Types of Aquifers-Aquiclude-Aquitard-Aquifuge   |           |
|            | 7   | Geological mapping of Rocks and structures in Ground water exploration  |           |
| <b>III</b> | <b>Watershed and Wetland Management</b>           |   | <b>10</b> |
|            | 8   | Watershed management: Concepts, Objectives and Practices  |           |
|            | 9   | Morphometric analysis: Stream Order, Stream Number, Bifurcation Ratio, Stream Length, Sinuosity Index, Drainage Density, Relief Aspects |           |
|            | 10  | Watershed Runoff estimates and Hydrological modeling  |           |
|            | 11  | Remote Sensing and GIS techniques for monitoring Water Quality  |           |
|            | 12  | Wetland mapping and Monitoring using Remote Sensing and GIS   |           |
| <b>IV</b>  | <b>Coastal Zone Management</b>                    |   | <b>10</b> |
|            | 13  | Marine Resources: Classification and Significance   |           |
|            | 14  | Remote Sensing and GIS for monitoring Maritime climate  |           |
|            | 15  | Shoreline Erosion and Coastal Storm prediction  |           |
|            | 16  | Coastal Zone Management: CRZ regulations in India - Coastal pollution and Rising sea levels   |           |
| <b>V</b>   | <b>Flood and Drought Monitoring</b>               |   | <b>5</b>  |
|            | 17  | Flood and Drought: Causes and Consequences  |           |
|            | 18  | Flood Forecasting: Real-time flood monitoring-Assessing water levels,   |           |

|  |    |  |  |
|--|----|--|--|
|  |    | Inundation extent  |  |
|  | 19 | Remote Sensing and GIS techniques in Drought Assessment and Prediction |  |

## **PRACTICAL**

**(30 Hours)**

**Exercise 1:** Morphometric analysis using DEM.

**Exercise 2:** Structural and Lineament mapping

**Exercise 3:** Groundwater potential zone mapping

**Exercise 4:** Terrain 3-D Mapping

**Exercise 5:** Flood Risk Assessment

## **References**

- Anji Reddy, M. 2004: Geoinformatics for Environmental Management B.S. Publications
- Chow, V.T., 1988: Advances in Hydro Science McGraw Hill
- Drury, S.A., 1987: Image Interpretation in Geology. Allen and Unwin
- Jensen, J.R. 2000 : Remote Sensing of the Environment: An Earth Resource Perspective. Prentice Hall Karanth, K.R., 1987: Groundwater Assessment-Development and Management. Tata McGraw Hill. Lillesand, T.M., and Kieffer, R.M., 1987: Remote Sensing and Image Interpretation, John Wiley.
- Miller, V.C., 1961: Photogeology. McGraw Hill.
- Paine, D.P., 1981: Aerial Photography and Image Interpretation for Resource Management. John Wiley.
- Pandey, S.N., 1987: Principles and Applications of Photogeology. Wiley Eastern, Sabbins, F.F., 1985: Remote Sensing Principles and Interpretation. W.H. Freeman and company
- Todd, D.K., 1980: Groundwater Hydrology. John Wiley
- Rajora, R., 2003: Integrated Watershed Management. Rawat Publication

## **Web References**

- <https://assets.cambridge.org>
- <https://ebooks.inflibnet.ac.in>
- <https://www.nrsc.gov.in>
- <http://ecoursesonline.iasri.res.in>
- <https://bhuvan-app1.nrsc.gov.in>
- <https://natural-resources.canada.ca>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Summarize fundamental principles of hydrology              | U               | PSO-1         |
| CO-2 | Describe components of Groundwater exploration             | U               | PSO-1         |
| CO-3 | Illustrate drainage patterns and morphometry               | An              | PSO-3         |
| CO-4 | Investigate Shoreline erosion and Coastal Pollution        | E               | PSO-3         |
| CO-5 | Propose flood and drought mitigation models                | C               | PSO-3         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: REMOTE SENSING AND GIS IN WATER RESOURCE**

**MANAGEMENT Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/ PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Summarize fundamental principles of hydrology       | PSO-1   | U               | F                  | L                        | -             |
| 2      | Describe components of Groundwater exploration      | PSO-1   | U               | P                  | L                        | -             |
| 3      | Illustrate drainage patterns and morphometry        | PSO-3   | An              | M                  | L                        | -             |
| 4      | Investigate Shoreline erosion and Coastal Pollution | PSO-3   | E               | M                  | -                        | P             |
| 5      | Propose flood and drought mitigation models         | PSO-3   | C               | M                  | -                        | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | 3    | -    | -    | -    | -    |
| CO 2 | 3     | -     | -     | -     | 3    | -    | -    | 3    | -    | -    | -    | -    |
| CO 3 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 4 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 5 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Project Evaluation | End Semester Examinations |
|------|---------------|------------|--------------------|---------------------------|
| CO 1 | ✓             | ✓          |                    | ✓                         |
| CO 2 | ✓             |            |                    | ✓                         |
| CO 3 | ✓             |            |                    | ✓                         |
| CO 4 | ✓             | ✓          |                    | ✓                         |
| CO 5 |               |            |                    | ✓                         |



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|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK6DSEGGY303</b>  |                  |                   |                    |                  |
| Course Title   | <b>DATABASE MANAGEMENT SYSTEM</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | VI   |                  |                   |                    |                  |
| Academic Level | 300-399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | This Course aims to provide fundamentals of DBMS, Data Models and Design |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Fundamentals of Database Management System</b> |   | 9   |
|            | 1   | Introduction to Database system: Concept of DBMS, Purpose of database system, View of data, Relational databases, Database architecture |     |
|            | 2   | Brief History of Database Management Systems  |     |
|            | 3   | Advantages and Disadvantages of Database Management System  |     |
| <b>II</b>  | <b>Relational Database Management System</b>      |   | 9   |
|            | 4   | Introduction to RDBMS: The Relational Model   |     |
|            | 5   | Introduction to Structured Query Language: Purpose and role of SQL  |     |
|            | 6   | Working with Relations of RDBMS: Creating Relations, Modifying Relations, Integrity constraints over the relation                       |     |
|            | 7   | Advantages and Disadvantages of RDBMS   |     |
| <b>III</b> | <b>Introduction to Database Structure</b>         |   | 9   |
|            | 8   | Levels of abstraction in DBMS: External, Conceptual, and Internal   |     |
|            | 9   | Data Independence: Logical data independence, Physical data independence  |     |
|            | 10  | Role of Database Users: Naive user, Application programmers, Sophisticated users, Specialized users                                     |     |
|            | 11  | Role of Database Administrator: functions of the DBA  |     |
|            | 12  | Transaction Management: Properties of Transactions  |     |
|            | 13  | Database Structure: Components of Database Management System  |     |
| <b>IV</b>  | <b>Data Models</b>                                |   | 9   |
|            | 14  | Introduction to Data Models: Evolution of Data Models   |     |
|            | 15  | Types of Data Model: Hierarchical databases, Network databases, Relational databases, Object oriented databases                         |     |
|            | 16  | Advantages and Disadvantages of Data Models   |     |
| <b>V</b>   | <b>Database Design</b>                            |   | 9   |
|            | 17  | Database design process: Conceptual Design, Physical Design, Database Implementation  |     |



|    |   |
|----|---|
| 18 | Entity-relationship modelling: ER Diagram, Constraints on relationship  |
| 19 | Relational database model: Logical view of data, keys, integrity rules, features of good relational database design |
| 20 | Limitation Of Entity Relationship Model   |

## PRACTICAL

(30 Hours)

**Exercise 1:** MS-Access and PostgreSQL query construction

**Exercise 2:** Table creation, renaming a Table, copying another table, Dropping a Table

**Exercise 3:** R Programming Language: Basic Exercises

**Exercise 4:** SQL Queries: Queries, Sub Queries, and Aggregate functions

**Exercise 5:** Web Map Using LeafletJS

## References

- A Silberschatz, H Korth, S Sudarshan, “Database System and Concepts”, fifth Edition McGraw-Hill, Rob, Coronel, “Database Systems”, Seventh Edition, Cengage Learning
- Fundamentals of Database Systems, Ramez Elmasri and Shamkant B. Navathe, , Pearson
- Database management systems, Ramakrishnan, and Gehrke, 3rd Edition, 2014, McGraw Hill
- Coronel, Morris, and Rob, Database Principles Fundamentals of Design, Implementation and Management, Cengage Learning 2012

## Web References

- <https://mgimond.github.io>
- <https://www.esri.com>
- <https://geo.libretexts.org>
- <https://www.javatpoint.com>
- <https://www.geeksforgeeks.org>

## Course Outcomes

| No.  | Upon completion of the course the graduate will be able to   | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand Concept of DBMS, Purpose of database system   | U               | PSO-1         |
| CO-2 | Design Structured Query Language   | Ap              | PSO-3         |
| CO-3 | Evaluate Database Structures, role of database users   | E               | PSO-3         |
| CO-4 | Differentiate Hierarchical databases, Network databases, Relational databases, Object oriented databases | An              | PSO-1,3       |

|      |  |   |       |
|------|--|---|-------|
| CO-5 | Develop Entity-relationship model and Diagrams | C | PSO-3 |
|------|--|---|-------|

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: DATABASE MANAGEMENT SYSTEM**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/ PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|----------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand Concept of DBMS, Purpose of database system   | PSO -1   | U               | F                  | L                        | -             |
| 2      | Design Structured Query Language   | PSO -3   | Ap              | M                  | L                        | -             |
| 3      | Evaluate Database Structures, role of database users   | PSO -3   | E               | P                  | L                        | -             |
| 4      | Differentiate Hierarchical databases, Network databases, Relational databases, Object oriented databases | PSO -1,3 | An              | C                  | -                        | P             |
| 5      | Develop Entity-relationship model and Diagrams   | PSO -3   | C               | M                  | -                        | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 2    | -    | -    | 3    | -    | 2    | 3    | -    |
| CO 2 | -     | -     | 2     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 3 | -     | -     | 2     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 4 | 2     | -     | 3     | -     | 3    | -    | -    | 3    | -    | 3    | 2    | -    |
| CO 5 | -     | -     | 2     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Project Evaluation | End Semester Examinations |
|------|---------------|------------|--------------------|---------------------------|
| CO 1 | ✓             |            |                    | ✓                         |
| CO 2 | ✓             |            |                    | ✓                         |
| CO 3 | ✓             |            |                    | ✓                         |
| CO 4 |               | ✓          |                    | ✓                         |
| CO 5 |               | ✓          |                    | ✓                         |



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|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK6DSEGGY304</b>  |                  |                   |                    |                  |
| Course Title   | <b>DISASTER MANAGEMENT FRAMEWORK</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | VI   |                  |                   |                    |                  |
| Academic Level | 300 - 399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | This course will develop the skill of understanding the various Legal, Institutional and Policy Framework of Disaster management |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content   | Hrs |
|------------|--|---|-----|
| <b>I</b>   | <b>Disaster Management – Legal, Institutional and Policy Framework</b> |   | 8   |
|            | 1  | Legal Framework for Disaster Management in India: Disaster Management Act 2005  |     |
|            | 2  | Genesis of the DM Act, Institutional Framework, under the DM Act  |     |
| <b>II</b>  | <b>Institutional framework</b>   |   | 10  |
|            | 3  | National Disaster Management Authority, State Disaster Management Authority, District Disaster Management Authority, National & State Executive Committees, National Institute for Disaster Management      |     |
|            | 4  | National Crisis Management Committee; Disaster Management Policy (National and State).  |     |
| <b>III</b> | <b>Financial Assistant Framework</b>                                   |   | 10  |
|            | 5  | Chief Minister's Distress Relief Fund (CMDRF) & National Disaster Response Fund Norms and Regulations in Compensation for Relief, Recovery and Rehabilitation   |     |
|            | 6  | Disaster Law and Policy Features: legal analysis of issues emerging from disastrous events, the causes of disasters and their relationship to laws designed to protect health, safety, and the environment. |     |
| <b>IV</b>  | <b>Stakeholders for Policy framework</b>                               |   | 8   |
|            | 7  | Role of various stakeholders-Central Govt, State Govt, District Administration, Local Self Government, Police, Fire & Rescue services, Armed Forces, NGO, Private sector and Community Based Organisations  |     |
|            | 8  | Human Rights issues in Disaster Management.   |     |
| <b>V</b>   | <b>Regulatory framework for DM</b>                                     |   | 9   |
|            | 9  | Acts and Policies relevant to Disaster Management in India:   |     |

|    |   |
|----|---|
|    | Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Wildlife Act, Forest Act, Biological Diversity Act, Maritime Zones of India Act                                    |
| 10 | Mines & Minerals Act, Groundwater Act, Atomic Energy Act, Oil & Natural Gas Act (including coal) The Mines and Minerals (Development and Regulation Act, 1957, ('MMDR') and the Mines Act, 1952 |
| 11 | Indian Maritime Law, Integrated Coastal Zone Regulation, Offshore Mining Regulation;  |
| 12 | Kerala Minor Mineral Concession Rules in the year 2015 and Kerala Minerals (Prevention of illegal mining, storage and transportation) Rules 2015.   |
| 13 | Map policy of India, Remote Sensing Policy, RTI Act, Privacy Act, National Data Sharing & Accessibility Policy  |

## PRACTICAL

(30 Hours)

**Exercise 1:** Prepare Community Action Plan

**Exercise 2:** Field visit (Disaster affected areas)

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- <https://ebooks.inflibnet.ac.in/geop15/chapter/legal-framework-issues-of-disaster-management/#:~:text=The%20Disaster%20Management%20Act%2C%202005,made%20responsible%20for%20handling%20disasters.>
- [https://ndma.gov.in/sites/default/files/PDF/Sikkim\\_Conclave/Session%202/1%20z%20NDMA%20Disaster%20Management%20PPT%20by%20JS%20\(PP\)%20-%20Revised.pdf](https://ndma.gov.in/sites/default/files/PDF/Sikkim_Conclave/Session%202/1%20z%20NDMA%20Disaster%20Management%20PPT%20by%20JS%20(PP)%20-%20Revised.pdf)
- <https://egyankosh.ac.in/bitstream/123456789/58956/1/Unit4.pdf>
- <https://sdma.kerala.gov.in/wp-content/uploads/2020/10/SDMF-Kerala-Guidelines-2012.pdf>
- <https://www.mha.gov.in/sites/default/files/2022-08/NPDM-101209%5B1%5D.pdf>

- <https://ebooks.inflibnet.ac.in/geop15/chapter/legal-framework-issues-of-disaster-management/#:~:text=The%20Disaster%20Management%20Act%2C%202005,made%20responsible%20for%20handling%20disasters.>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                        | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understand the basic concepts of Legal Framework for Disaster Management in India | U               | PSO - 1       |
| CO-2 | Identify various institutional frameworks for DM                                  | R               | PSO - 2       |
| CO-3 | Analyze the different financial frameworks by various agencies                    | An              | PSO - 3       |
| CO-4 | Identify the Role of various stakeholders in DM                                   | R               | PSO - 2       |
| CO-5 | Analyze all disaster management acts and policies in India.                       | An              | PSO - 3       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: DISASTER MANAGEMENT – LEGAL, INSTITUTIONAL AND POLICY FRAMEWORK**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO  | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the basic concepts of Legal Framework for Disaster Management in India | PSO - 1 | U               | F, C               | L                        | -             |
| 2      | Identify various institutional framework for DM                                   | PSO - 2 | R               | F, C               | L                        | P             |
| 3      | Analyse the different financial framework by various agencies                     | PSO - 3 | An              | M                  | L                        | -             |
| 4      | Identify the Role of various stakeholders for DM                                  | PSO - 2 | R               | F                  | L                        | -             |
| 5      | Analyse all disaster management act and policies in India.                        | PSO - 3 | An              | M, C               | L                        | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | 1     | -     | -     | 3    | -    | -    | 2    | -    | -    | -    | -    |
| CO 2 | 1     | 3     | -     | -     | -    | 3    | 2    | -    | -    | -    | -    | -    |
| CO 3 | -     | -     | 3     | 1     | -    | -    | -    | -    | 1    | 3    | -    | -    |
| CO 4 | 1     | 3     | -     | -     | -    | 3    | 2    | -    | -    | -    | -    | -    |
| CO 5 | -     | -     | 3     | 1     | -    | -    | -    | -    | 1    | 3    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Quiz | End Semester Examinations |
|------|---------------|------------|------|---------------------------|
| CO 1 | ✓             |            |      | ✓                         |
| CO 2 | ✓             |            | ✓    | ✓                         |
| CO 3 | ✓             |            |      | ✓                         |
| CO 4 |               | ✓          |      | ✓                         |
| CO 5 |               |            | ✓    |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK6DSEGGY305</b>   |                  |                   |                    |                  |
| Course Title   | <b>CLIMATE CHANGE AND ENVIRONMENTAL DISASTERS</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>  |                  |                   |                    |                  |
| Semester       | VI  |                  |                   |                    |                  |
| Academic Level | 300-399   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 4 hours          | -                 | -                  | 4                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | It covers the impact of climate change on the environment and environmental disasters. Climate change induced disasters like drought, flood and desertification on a regional scale is also discussed . |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                  | Content   | Hrs |
|------------|---------------------------------------|---|-----|
| <b>I</b>   | <b>Introduction to Climate Change</b> |   | 12  |
|            | 1                                     | Weather and Climate- Components of Climate System   |     |
|            | 2                                     | Paleoclimates: Evolution of Atmosphere-Climate forcings   |     |
|            | 3                                     | Climate Change: Meaning and Definition-Global Warming   |     |
|            | 4                                     | Drivers of Climate Change: Human interventions leading to climate change-enhanced Greenhouse Effect-Global warming    |     |
| <b>II</b>  | <b>Regional Climate Variability</b>   |   | 12  |
|            | 5                                     | Global climate: Changes in climate extremes-long term and short-term changes- Regional patterns of climate change     |     |
|            | 6                                     | Drivers of Regional climate variability and change-Monsoonal response to climate change                               |     |
|            | 7                                     | Appraisal of the Changing patterns of Monsoon in Kerala   |     |
| <b>III</b> | <b>Climate Change and Disasters</b>   |   | 12  |
|            | 8                                     | Impacts of Climate change: Sea Level Rise-Impacts on Terrestrial Ecosystems-Glacier melting                           |     |
|            | 9                                     | Wetland Degradation - Loss of Biodiversity-Impacts on Marine Environment  |     |
|            | 10                                    | Drought and floods resulting from changes in Climate Patterns   |     |
|            | 11                                    | Socio-economic impacts of climate change: Physical and Mental Health-Indigenous people-Gender-Climate change refugees |     |
| <b>IV</b>  | <b>Desertification</b>                |   | 12  |
|            | 12                                    | Desertification: Definition and Causes-Effects on Environment and People  |     |
|            | 13                                    | Geographical Areas affected by Desertification: Sahel, Gobi Desert, South America                                     |     |
|            | 14                                    | Countering Desertification: Need and Techniques of Mitigation   |     |



| <b>Climate Modelling and Disaster Risk Reduction</b> |    |   |
|--|----|---|
| <b>V</b>   | 15 | Basic Types of Global climate models: Energy Balance Models- Radiative-Convective Model- Dimensionally Constrained models- Global Circulation Models- Earth System Models |
|  | 16 | Remote sensing technologies for monitoring climate change: Applications and Benefits.   |
|  |    | <b>12</b>   |

### References

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- Birkland, Thomas (2006) Lessons of Disaster: Policy Change after Catastrophic Events, Washington, DC; Georgetown University Press
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- Iribarne J V & W L (1981) Godson Atmospheric Thermodynamics (Second Edition), Springer.
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- Mason B J (2010) Clouds, Rain and Rain Making (second Edition), Cambridge University Press.
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- Neuberger H (1966) Introduction to Physical Meteorology, The Pennsylvania State University Press.
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### Web Resources

- <https://www.un.org/en/climatechange/what-is-climate-change#:~:text=Climate%20change%20refers%20to%20long,activity%20or%20large%20volcanic%20eruptions>.
- <https://www.fao.org/3/a1247e/a1247e02.pdf>
- <https://www.usgs.gov/faqs/how-can-climate-change-affect-natural-disasters>
- <https://www.nationalgeographic.com/environment/article/desertification>

### Course Outcomes

| No. | Upon completion of the course the graduate will be able to | Cognitive Level | PSO addressed |
|-----|--|-----------------|---------------|
|-----|--|-----------------|---------------|

|       |  |    |            |
|-------|--|----|------------|
| CO-1  | Understand the climate change dynamics         | U  | PSO - 1    |
| CO-2  | Evaluate regional climate variability          | E  | PSO – 3    |
| CO- 3 | Evaluate the impacts and adaptation strategies | E  | PSO – 3    |
| CO- 4 | Analyse desertification challenges             | An | PSO – 3, 2 |
| CO -5 | Apply climate models and remote sensing        | Ap | PSO – 4    |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: CLIMATE CHANGE AND ENVIRONMENTAL DISASTERS**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO   | PO/PSO     | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial(T) | Practical(P) |
|--------|--|------------|-----------------|--------------------|-------------------------|--------------|
| 1      | Understand the climate change dynamics         | PSO - 1    | U               | F                  | L                       | -            |
| 2      | Evaluate regional climate variability          | PSO – 3    | E               | M                  | L                       | -            |
| 3      | Evaluate the impacts and adaptation strategies | PSO – 3    | E               | M                  | L                       | -            |
| 4      | Analyse desertification challenges             | PSO – 3, 2 | An              | M, F               | L                       | -            |
| 5      | Apply climate models and remote sensing        | PSO – 4    | Ap              | F, C, M            | L                       | -            |

**F-Factual, C- Conceptual, P-Procedural, M- Metacognitive**

**Mapping of COs with PSOs and POs :**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | -    | -    | 1    | -    | -    | 2    | -    | -    |
| CO 2 | -     | 1     | 3     | -     | -    | -    | -    | -    | -    | 2    | -    | 3    |
| CO 3 | -     | 1     | 3     | -     | -    | -    | -    | -    | -    | 2    | -    | 3    |
| CO 4 | -     | 2     | 3     | 2     | -    | -    | -    | -    | -    | 2    | 2    | 3    |
|      |       |       |       |       |      |      | -    | -    | -    | -    | 3    | 2    |

|      |   |   |   |   |   |   |  |  |  |  |  |  |
|------|---|---|---|---|---|---|--|--|--|--|--|--|
| CO 5 | - | 1 | - | 3 | - | - |  |  |  |  |  |  |
|------|---|---|---|---|---|---|--|--|--|--|--|--|

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Quiz | End Semester Examinations |
|------|---------------|------------|------|---------------------------|
| CO 1 | ✓             |            |      | ✓                         |
| CO 2 | ✓             |            | ✓    | ✓                         |
| CO 3 |               |            |      | ✓                         |
| CO 4 | ✓             | ✓          | ✓    | ✓                         |
| CO 5 | ✓             |            | ✓    |                           |



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|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK6DSEGGY306</b>  |                  |                   |                    |                  |
| Course Title   | <b>URBAN DESIGN AND URBAN MORPHOLOGY</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | V  |                  |                   |                    |                  |
| Academic Level | 300-399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 4 hours          | -                 | 0                  | 4                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | The course helps the student to develop the concept of urban design at various urban scales. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content   | Hrs       |
|------------|---|---|-----------|
| <b>I</b>   | <b>Introduction to Urban Design</b>             |   | <b>12</b> |
|            | 1   | Introduction of Urban Design and Cities   |           |
|            | 2   | Components of Urban Design-Buildings-Public Space-Streets-Transport-Landscape   |           |
|            | 3   | Brief historical overview- Ancient cities – Greece –Rome- Medieval Cities- Industrial Revolution and City Growth -Slums- City Beautiful Movement- Garden City concept- World wars and aftermath on the rise of modern cities- skyscrapers- New York city. |           |
|            | 4   | Indian historical developments- principles of city and town planning- Indraprastha and Nine square plan of Jaipur-Temple towns-Mughal cities-Colonial cities- Chennai- Mumbai-Calcutta.Modern city- Chandigarh, Gandhinagar, Bhuvaneshwar                 |           |
| <b>II</b>  | <b>Introduction to theories of Urban design</b> |   | <b>12</b> |
|            | 5   | Figure Ground theory- Place theory -Linkage theory  |           |
|            | 6   | Kevin Lynch's theory of imageability  |           |
|            | 7   | New Urbanism of Krier; Public and Private domains; Suburbs and Periphery; Privacy, Territoriality and Proxemic theory; Defensible spaces;   |           |
|            |   | Ideas of community through design -Current hypothesis on children and urban environment. - ideas of smart growth- New Urbanism-landscape Urbanism.  |           |
| <b>III</b> | <b>Introduction to Urban Morphology</b>         |   | <b>12</b> |
|            | 8   | Determinants of urban form and structure - Size, shape and form of cities.  |           |
|            | 9   | Components and structure. Concept of typologies. Elements Entities and the Whole  |           |
|            | 10  | Units of urban design intervention  |           |
|            | 11  | Various theoretical views associated with the nature of city form (normative, positive, substantive and procedural theories); Cosmic, Machine and Organic Models; Descriptive and functional theories;  |           |

|           |   |   |           |
|-----------|---|---|-----------|
|           |   | Alternative theoretical postulations.   |           |
| <b>IV</b> | <b>Approaches and Techniques of Urban Designing</b> |   | <b>12</b> |
|           | 12  | Urban Planning-Geographic mapping and analysis  |           |
|           | 13  | City as patterns; diagrams; spaces and ideas -organic; grid; political functional-secularist-socialist diagrams; grand manner; skyline; city edge; urban division; public spaces- various typologies including street and park.                           |           |
|           | 14  | Transportation and Urban Form: Urban form- Urban spatial structure-Centralization-Clustering, Structural Elements-Nodes, Linkages. Transportation and Urban Structure: Types- Completely Motorized Network- Weak Centre-Strong Centre- Traffic Limitation |           |
| <b>V</b>  | <b>Urban Design and Sustainability</b>              |   | <b>12</b> |
|           | 15  | Concept of Urban Redevelopment, Urban Renewal, Urban Reconstruction and Urban Rejuvenation  |           |
|           | 16  | Urban design and sustainability   |           |
|           | 17  | Case study of best practice in India- Bhendi Bazaar in Mumbai and Navi Mumbai   |           |
|           | 18  | Case study of best practice in International Level-Battery Park in Newyork  |           |

## References

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- Bentley, "Responsive Environments: A Manual for Designers," Routledge, 2015.
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## Web References

- <https://urbandesignlab.in/7-elements-of-urban-design/>
- [https://www.geos.ed.ac.uk/~gisteac/gis\\_book\\_abridged/files/ch62.pdf](https://www.geos.ed.ac.uk/~gisteac/gis_book_abridged/files/ch62.pdf)
- <https://transportgeography.org/contents/chapter8/transportation-urban-form>

## Course Outcomes

| No   | Upon completion of Urban Design and Urban Morphology, the graduate will be able to  | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | To acquaint students with the historical background of urban design and to know how cities evolved, various forces that played crucial roles in the evolution of cities | R, U            | PSO 1         |
| CO-2 | To comprehend the theories, principles, processes methods of urban design   | R, U            | PSO 1         |
| CO-3 | To understand the various city forms  | U               | PSO 2         |
| CO-4 | To examine the approaches and techniques in urban designing   | R,U             | PSO 2,PSO 3   |
| CO-5 | To demonstrate the applicability of urban designing.  | C, Ap           | PSO 3, PSO 4  |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: URBAN DESIGN AND URBAN MORPHOLOGY**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/ PSO  | Cognitive Level | Knowledge Category | Lecture (L)/ Tutorial (T) | Practical (P) |
|--------|---|----------|-----------------|--------------------|---------------------------|---------------|
| 1      | To acquaint students with the historical background of urban design and to know how cities evolved, various forces that played crucial roles in the evolution of cities | PSO 1    | R,U             | F,C                | L                         | -             |
| 2      | To comprehend the theories, principles, processes methods of urban design   | PSO 1    | R,U             | F,C                | L                         | -             |
| 3      | To understand the various city forms  | PSO 2    | U               | C                  | L                         | -             |
| 4      | To examine the approaches and techniques in urban designing   | PSO 2, 3 | R,U             | F,C                | L                         | -             |

|   |  |          |       |     |   |   |
|---|--|----------|-------|-----|---|---|
| 5 | To demonstrate the applicability of urban designing. | PSO 3, 4 | C, Ap | P,M | L | - |
|---|--|----------|-------|-----|---|---|

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | 2    | -    | -    | -    | -    | -    | 2    |
| CO 2 | 3     | -     | -     | -     |      |      | 3    |      |      |      |      |      |
| CO 3 | -     | 3     | -     | -     |      | 3    |      |      |      |      |      |      |
| CO 4 | -     | 3     | 3     | -     | -    | -    | -    | -    | -    | 2    | 3    | -    |
| CO 5 | -     | -     | 3     | 3     | -    | -    | -    | -    | -    | 3    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          |            | ✓                         |
| CO 5 |               |            | ✓          | ✓                         |



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|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK6DSEGGY307</b>   |                  |                   |                    |                  |
| Course Title   | <b>URBAN ECOLOGY AND ENVIRONMENTAL PLANNING</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>  |                  |                   |                    |                  |
| Semester       | VI  |                  |                   |                    |                  |
| Academic Level | 300-399   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 4 hours          | -                 | 0                  | 4                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | The objective of the paper is to give students a deeper understanding of urban ecological and environmental issues, help them recognise potential solutions for cities to address threats and challenges related to the environment, and improve their knowledge and skills in assessing how urban development affects the environment. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content   | Hrs |
|------------|--|---|-----|
| <b>I</b>   | <b>Man-Environment Relationship</b>              |   | 12  |
|            | 1  | Man and Environment- Changing perspectives in Man-Environment Relations focusing on issues of Current Population, Urbanization, Resource Depletion and Pollution Scenario |     |
|            | 2  | Impact of urbanization in modifying the natural environment- Causes and consequence   |     |
|            | 3  | Issues of the Urban environment in today's world: urban sprawl - waste management - pollution - water supply etc  |     |
| <b>II</b>  | <b>Concept of Urban Ecosystem &amp; Planning</b> |   | 12  |
|            | 4  | Urban ecosystem: definition- components   |     |
|            | 5  | Urban ecology- Need for urban ecosystem approach- its significance  |     |
|            | 6  | Concepts and relevance of Environmental Planning- Objectives of environmental planning and design- Eco-city concepts  |     |
| <b>III</b> | <b>Pollution and Environmental Monitoring</b>    |   | 12  |
|            | 7  | Air Pollution- causes and their effects- emission standards -Delhi Air pollution case study   |     |
|            | 8  | Water Pollution- causes and their mitigation measures - Case studies related to water harvesting in India   |     |
|            | 9  | Noise Pollution- sources - noise level standards  |     |
|            | 10   | Land Pollution- causes- mitigation measures   |     |
| <b>IV</b>  | <b>Urban Environment Management</b>              |   | 12  |
|            | 11   | EIA- definition, need and objectives- Role of EIA in the planning and decision-making process   |     |



|          |   |   |    |
|----------|---|---|----|
|          | 12  | Sustainable development and sustainability in geography- Need for Strategic Environmental Assessment in Urban Areas- Land policy in urban planning  |    |
|          | 13  | GHGs and energy in cities- Definition of GHGs- major sources- GHG footprints of major Indian cities (Delhi/ Greater Mumbai/Kolkata/ Chennai/Bangalore on electricity consumption, domestic sector, transportation sector, industrial sector and agriculture activities          |    |
|          | 14  | GIS in urban planning- Role of GIS mapping in urban planning- Advantages of using GIS in urban Land use planning and management, Spatial planning, analysis & modelling, Infrastructure and transportation planning, Resilience planning and Citizen engagement & communication |    |
| <b>V</b> | <b>Environmental Legislation and Policies</b> |   | 12 |
|          | 15  | International Environmental Policies- UNEP, Policy of G8 & G20 countries, IUCN  |    |
|          | 16  | Conventions & Protocols - Ramsar Convention - Montreal Protocol - Kyoto Protocol - UNFCCC - Rio Summit - COP21 - COP25  |    |
|          | 17  | National Environmental Policy of India: 2006- National Green Tribunal Act, 2010   |    |

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### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                               | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | To understand and discuss how humans are components of urban ecosystems                  | U               | PSO- 1, 2     |
| CO-2 | Analyse the impact of urbanization and industrialization on the natural environment      | R, An           | PSO- 2        |
| CO-3 | To familiarize the concept of ecology in an urban context                                | U               | PSO- 2        |
| CO-4 | Classify various issues of the urban environment   | Ap              | PSO- 3        |
| CO-5 | Investigate the role of EIA and GIS in urban ecological planning                         | E               | PSO- 4        |
| CO-6 | Examine the objectives of various protocols and conventions for environmental protection | An              | PSO- 3, 4     |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: URBAN ECOLOGY AND ENVIRONMENTAL PLANNING**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/ PSO    | Cognitive Level | Knowledge Category | Lecture (L)/ Tutorial (T) | Practical (P) |
|--------|--|------------|-----------------|--------------------|---------------------------|---------------|
| 1      | To understand and discuss how humans are components of urban ecosystems                  | PSO - 1, 2 | U               | F                  | L                         | -             |
| 2      | Analysing the impact of urbanization and industrialization on the natural environment    | PSO - 2    | R, An           | C, P               | L                         | -             |
| 3      | To familiarize the concept of ecology in an urban context                                | PSO - 2    | U               | F, C               | L                         | -             |
| 4      | Classify various issues of the urban environment   | PSO - 3    | Ap              | P                  | L                         | -             |
| 5      | Investigate the role of EIA and GIS in urban ecological planning                         | PSO - 4    | E               | M                  | L                         | -             |
| 6      | Examine the objectives of various protocols and conventions for environmental protection | PSO - 3, 4 | An              | M                  | L                         | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO1 | PSO2 | PSO3 | PSO 4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO 6 | PO 7 | PO 8 |
|------|------|------|------|-------|-----|-----|-----|-----|-----|------|------|------|
| CO 1 | 3    | 2    | -    | -     | 3   | -   | -   | -   | -   | -    | -    | -    |
| CO 2 | -    | -    | 3    | -     | 3   | -   | -   | -   | -   | -    | -    | 2    |
| CO 3 | -    | 2    | -    | -     | -   | 2   | -   | -   | -   | -    | -    | 2    |
| CO 4 | -    | -    | 3    | -     | -   | -   | 2   | -   | -   | -    | -    | 3    |
| CO 5 | -    | -    | -    | 3     | -   | -   | -   | -   | -   | 2    | 3    | 2    |

|      |   |   |   |   |    |   |   |   |   |   |   |   |
|------|---|---|---|---|----|---|---|---|---|---|---|---|
| CO 6 | - | - | 2 | 3 | -- | - | - | - | - | - | - | - |
|------|---|---|---|---|----|---|---|---|---|---|---|---|

**Assessment Rubrics:**

- Quiz / Assignment
- Discussion / Seminar
- Midterm Exam
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Project Evaluation | End Semester Examinations |
|------|---------------|------------|--------------------|---------------------------|
| CO 1 |               | ✓          |                    | ✓                         |
| CO 2 | ✓             | ✓          |                    | ✓                         |
| CO 3 | ✓             |            |                    | ✓                         |
| CO 4 | ✓             |            | ✓                  | ✓                         |
| CO 5 | ✓             |            |                    | ✓                         |
| CO 6 | ✓             | ✓          |                    |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK6DSCGGY308</b>  |                  |                   |                    |                  |
| Course Title   | <b>EVOLUTION OF GEOGRAPHICAL THOUGHT</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | <b>VI</b>  |                  |                   |                    |                  |
| Academic Level | 300 -399   |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 4 hours          | -                 |                    | 4                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | This paper deals with the historical and philosophical development of modern geography and geographical knowledge. It focuses on contributions of different schools of thought, dichotomies in Geography and recent developments in the subject. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content  | Hrs |
|------------|---|--|-----|
| <b>I</b>   | <b>Geography In The Ancient Period</b>                  |  | 12  |
|            | 1   | Historical development of Geography.   |     |
|            | 2   | Contribution of Greek and Roman Geographers – Herodotus, Eratosthenes, Strabo and Ptolemy. |     |
|            | 3   | Development of geographical thoughts in ancient India.                                     |     |
| <b>II</b>  | <b>Geography In The Medieval Period</b>                 |  | 12  |
|            | 4   | Characteristics of Geography in medieval period  |     |
|            | 5   | The Dark Age   |     |
|            | 6   | Arab Geographical Thought- Contribution of Arab geographers-Al Msudi and Al Idrisi         |     |
| <b>III</b> | <b>History Of Geographical Thought In Modern Period</b> |  | 12  |
|            | 7   | Main characteristics of Arab, German , French ,American and British schools of thought.    |     |
|            | 8   | Contribution of German geographers - Friedrich Ratzel and Alfred Hettner                   |     |
|            | 9   | Contribution of French geographers - Jean Brunet and Albert Demangeon                      |     |
|            | 10  | Contribution of American geographers – Semple and Huntington                               |     |
|            | 11  | Contribution of British geographers : Halford J Mackinder and Herbertson                   |     |
| <b>IV</b>  | <b>Dichotomies In Geography</b>                         |  | 12  |
|            | 12  | Human vs. Physical   |     |
|            | 13  | Systematic vs. Regional  |     |
|            | 14  | Applied vs. Quantitative   |     |

| V | Recent Trends In Geography |   | 12 |
|---|----------------------------|---|----|
|   | 15                         | Quantitative Revolution and its Impact  |    |
|   | 16                         | Paradigm shift in geography: Modern Themes in Geographical Thought –Welfare approach, Radical approach. |    |

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- <https://ebooks.inflibnet.ac.in/geop06/chapter/139/>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                                       | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Students familiarize with the major landmarks in development of geographic thought through time. | R,U             | PSO-1         |
| CO-2 | Develop critical skills for integrating and evaluating geographic literature                     | U,C             | PSO-2         |
| CO-3 | Analyses the various dimensions of Geographical Thoughts   | An              | PSO-1         |
| CO-4 | Understands recent developments in Geography   | U               | PSO-1         |
| CO-5 | Critically evaluates the modern approaches of Geography  | Ap, E           | PSO-1         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: EVOLUTION OF GEOGRAPHICAL THOUGHT**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO   | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|--------|-----------------|--------------------|--------------------------|---------------|
| 1      | Students familiarize with the major landmarks in development of geographic thought through time. | PSO-1  | R,U             | F                  | L                        |               |
| 2      | Develop critical skills for integrating and evaluating geographic literature                     | PSO-2  | U,C             | F ,M               | L                        |               |
| 3      | Analyses the various dimensions of Geographical Thoughts   | PSO-1  | An              | M                  | L                        |               |
| 4      | Understands recent developments in Geography   | PSO-1  | U               | F,M                | L                        |               |

|   |   |       |       |   |   |  |
|---|---|-------|-------|---|---|--|
| 5 | Critically evaluates the modern approaches of Geography | PSO-1 | Ap, E | M | L |  |
|---|---|-------|-------|---|---|--|

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | -     | 2     | 1     | -     | -    | 2    | 2    | -    | -    | -    | -    | -    |
| CO 3 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 4 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 5 | 3     | -     | -     | -     | 3    | -    | -    | 1    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             | ✓          |            | ✓                         |
| CO 3 | ✓             | ✓          |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             | ✓          |            |                           |





**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK6DSEGGY309</b>   |                  |                   |                    |                  |
| Course Title   | <b>SOIL GEOGRAPHY</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>  |                  |                   |                    |                  |
| Semester       | VI  |                  |                   |                    |                  |
| Academic Level | 300-399   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | The paper aims to introduce students to basic soil science concepts, such as soil formation, profiles, categorization, global and Indian distribution, and sustainable soil management and conservation techniques. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                  | Content   | Hrs |
|------------|---------------------------------------|---|-----|
| <b>I</b>   | <b>Introduction to Soil Geography</b> |   | 6   |
|            | 1                                     | Significance of Soil Geography; Importance of Soil Studies in Geography; Meaning, scope and content of Soil Geography; Pedology: Relationship of Soil Geography with Pedology |     |
|            | 2                                     | Soil: Factors influencing soil formation; Process of soil formation and development   |     |
| <b>II</b>  | <b>Profile and Properties</b>         |   | 12  |
|            | 3                                     | Soil Profile and Soil Horizon: types and characteristics  |     |
|            | 4                                     | Physical properties of soil: Texture –Structure- Consistence- Temperature- Colour   |     |
|            | 5                                     | Chemical properties of soil - Organic Matter- Nitrogen- Phosphorous- Potassium- Secondary Nutrients- pH and Salinity  |     |
|            | 6                                     | Micro-organisms- Distribution and Functions of Micro organisms  |     |
| <b>III</b> | <b>Classifications</b>                |   | 9   |
|            | 7                                     | General: Residual & transported   |     |
|            | 8                                     | Zonal system of classification: Zonal, Azonal and Intrazonal  |     |
|            | 9                                     | USDA Soil Taxonomy  |     |
|            | 10                                    | ICAR classification of India  |     |
| <b>IV</b>  | <b>Erosion &amp; Consequences</b>     |   | 9   |
|            | 11                                    | Types of Erosion: Normal/Geologic Erosion (Wind and Water) and Accelerated Erosion  |     |
|            | 12                                    | Consequences of Erosion   |     |
|            | 13                                    | Urban Erosion and Runoff  |     |
| <b>V</b>   | <b>Conservation Management</b>        |   | 9   |
|            | 14                                    | Soil Conservation- Need- Techniques   |     |

|  |    |   |  |
|--|----|---|--|
|  | 15 | Soil Management- Need- Principles- Goals- Practices |  |
|  | 16 | USDA conservation programs                          |  |
|  | 17 | Soil Health Management NMSA of Govt. of India       |  |

## PRACTICAL

(30 Hours)

**Exercise 1:** Compare the characteristics of various ICAR soil types.

**Exercise 2:** Field-based estimation of the pH of soils in nearby locality.

**Exercise 3:** Testing and mapping soil moisture of different soils in a local area.

**Exercise 4:** Texture analysis of soil samples collected from the local area

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### Course Outcomes

| No.  | Upon completion of the course, the graduate will be able to                                      | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Compare the approaches of soil geography and Pedology in soil study.                             | U               | PSO-1,2       |
| CO-2 | Identifying and estimating the properties of various soils                                       | R, An           | PSO-2, 3      |
| CO-3 | Examining the types of soil horizons and soil erosion  | U, Ap           | PSO-2         |
| CO-4 | Analysing the physical properties with water holding capacity of soil                            | R, An           | PSO-3         |
| CO-5 | Assessing the soil moisture and pH values of various soils                                       | E               | PSO-3         |
| CO-6 | Comparing and analysing the solutions for soil conservations and policies of various governments | U, An           | PSO-4         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: Soil Geography**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/ PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Compare the approaches of Soil Geography and Pedology in soil study.  | PSO-1,2 | U               | F                  | L                        | -             |
| 2      | Identifying and estimating the properties of various soils            | PSO-2,3 | R, An           | C, P               | L                        | P             |
| 3      | Examining the types of soil horizons and soil erosion                 | PSO-2   | U, Ap           | C, P               | L                        | P             |
| 4      | Analysing the physical properties with water holding capacity of soil | PSO-3   | R, An           | P                  | L                        | -             |

|   |  |          |       |   |   |   |
|---|--|----------|-------|---|---|---|
| 5 | Assessing the soil moisture and pH values of various soils                                       | PSO-3    | E     | P | - | P |
| 6 | Comparing and analysing the solutions for soil conservations and policies of various governments | PSO-3, 4 | U, An | M | L | - |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PS O1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 | PSO 6 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 2     | 2     | -     | -     | -     | -     | 2    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | -     | 2     | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | 2    | -    |
| CO 3 | -     | 3     | -     | -     | -     | -     | -    | 3    | 2    | -    | -    | -    | -    | 2    |
| CO 4 | -     | -     | 2     | -     | -     | -     | -    | -    | 2    | -    | -    | -    | -    | -    |
| CO 5 | -     | -     | 2     | -     | -     | -     | -    | -    | -    | -    | -    | 3    | 2    | -    |
| CO 6 | -     | -     | 2     | 3     | -     | -     | -    | -    | -    | -    | -    | -    | -    | 2    |

**Assessment Rubrics:**

- Quiz / Assignment
- Discussion / Seminar/ Field work
- Midterm Exam
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Project Evaluation | End Semester Examinations |
|------|---------------|------------|--------------------|---------------------------|
| CO 1 | ✓             |            |                    | ✓                         |
| CO 2 | ✓             |            |                    | ✓                         |
| CO 3 | ✓             | ✓          |                    | ✓                         |
| CO 4 | ✓             | ✓          |                    | ✓                         |
| CO 5 |               |            | ✓                  | ✓                         |
| CO 6 | ✓             | ✓          |                    |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK6SECGGY300</b>  |                  |                   |                    |                  |
| Course Title   | <b>GIS FOR ENVIRONMENT AND HUMAN RESOURCES MANAGEMENT</b>  |                  |                   |                    |                  |
| Type of Course | <b>SEC</b>   |                  |                   |                    |                  |
| Semester       | VI   |                  |                   |                    |                  |
| Academic Level | 300-399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 3  | 3 hours          | -                 | -                  | 3                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | This syllabus provides a structured overview of GIS concepts and their applications in environmental and human resources management, with a focus on hands-on learning and practical skills development. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content  | Hrs |
|------------|---|--|-----|
| <b>I</b>   | <b>Introduction to Resources</b>                                  |  | 9   |
|            | 1   | Concept of resource – Classification of Resources : Environment and Human Resources; Significance                                    |     |
|            | 2   | Resources Management: Definition; Ecological, social and economic dimension of resource management.                                  |     |
| <b>II</b>  | <b>Applications of GIS in Environmental Resources Management</b>  |  | 9   |
|            | 3   | Geographic Information Systems (GIS) : Components, Applications  |     |
|            | 4   | Applications of GIS in ERM: Coastal zone management, Forestry and Wildlife management, Landform studies, Land use/cover mapping      |     |
| <b>III</b> | <b>Applications of GIS in Human Resources Management</b>          |  | 9   |
|            | 5   | GIS in Surface and underground water mapping, weather monitoring, Mineral resources, Agriculture                                     |     |
|            | 6   | GIS Applications for Demographic analysis : Spatial distribution of population according to age, gender - Crime Mapping and analysis |     |
| <b>IV</b>  | <b>Health GIS</b>   |  | 9   |
|            | 7   | Applications of GIS in telecommunication industry, trade area analysis, site selection, facility management                          |     |
|            | 8   | Vehicle routing and scheduling using GIS, Vehicle Tracking System, GIS application in Tourism planning                               |     |
| <b>V</b>   | <b>Health GIS</b>   |  | 9   |
|            | 9   | Application of GIS in Epidemics control and Mitigation   |     |
|            | 10  | Disease mapping and Health facility location mapping - Health and disease atlas of Kerala.   |     |
| <b>V</b>   | <b>GIS Applications in Administration and Disaster Management</b> |  | 9   |
|            | 11  | Kerala Model of Development – GIS in Local Administration and Planning   |     |
|            | 12  | GIS in Disaster Management Process : An Overview of recent disasters   |     |

## Reference

- Haywood, Ian, Cornelius, Sarah & Carver, Steve (any edition), 'An Introduction to Geographical Information Systems, Prentice Hall, Pearson Education, U.K
- Canada Center for Remote Sensing, 'Fundamentals of Remote Sensing, Canada
- Konecny Gottified, 'Geoinformation: Remote Sensing, Photogrammetry and Geographic Information Systems', Taylor and Francis, London, 2003
- The GIS Glossary, Environmental System Research Institute, Canada, 1996
- Longley, Paul A et al. 'Geographic Information Systems and Science, John Wiley
- Francis Harvey, 'A Primer of GIS: Fundamentals of Geographic and Cartographic Concepts', The Guildford Press New York, 2008
- De By, Rolf A 'Principles of Geographic Information Systems' ITC Educational Textbook Series, ITC, Netherlands, 2001

## Web Reference

- <http://otec.uoregon.edu/data-wisdom.htm>
- <http://www.pasda.psu.edu/tutorials/gisbasics.asp>
- [http://catalog.flatworldknowledge.com/bookhub/reader/3798?e=campbell\\_1.0-ch03\\_s01](http://catalog.flatworldknowledge.com/bookhub/reader/3798?e=campbell_1.0-ch03_s01)

## Course Outcomes

| No.  | Upon completion of the course the graduate will be able to               | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the concept of Resources and its Management                   | U               | PSO-1,2       |
| CO-2 | Understand the Applications of GIS in Environmental Resources Management | U               | PSO-1,3       |
| CO-3 | Use GIS in Human Resources Management                                    | C               | PSO-3         |
| CO-4 | Apply GIS techniques in Epidemics control and Mitigation                 | Ap              | PSO-3         |
| CO-5 | Apply GIS in Administration and Disaster Management                      | Ap              | PSO-3         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: GIS FOR ENVIRONMENT AND HUMAN RESOURCES MANAGEMENT**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|----|--------|-----------------|--------------------|--------------------------|---------------|
|        |    |        |                 |                    |                          |               |

|   |  |         |    |      |   |  |
|---|--|---------|----|------|---|--|
| 1 | Understand the concept of Resources and its Management   | PSO-1,2 | U  | F, C | L |  |
| 2 | Understand the principles of GIS, including data management, spatial analysis, and cartography.  | PSO-1,3 | U  | P    | L |  |
| 3 | Use GIS software to create, manage, and analyze spatial data                                     | PSO-3   | C  | P,M  | L |  |
| 4 | Apply GIS techniques to solve real-world problems in Environmental and Human Resource management | PSO-3   | Ap | P,M  | L |  |
| 5 | Apply GIS in health studies  | PSO-3   | Ap | P,M  | L |  |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|      | PS O1 | PS O2 | PS O3 | PS O4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | 3     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | -     | 3     | -     | 3    | -    | -    | -    | -    | 3    | -    | -    |
| CO 3 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | -    | 3    | -    |
| CO 4 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 5 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | -    | 3    | -    |

**Assessment Rubrics:**

- Quiz / Assignment / Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Quiz | End Semester Examinations |
|------|---------------|------------|------|---------------------------|
| CO 1 | ✓             |            |      | ✓                         |
| CO 2 | ✓             |            | ✓    | ✓                         |
| CO 3 | ✓             |            | ✓    | ✓                         |
| CO 4 | ✓             | ✓          | ✓    | ✓                         |
| CO 5 | ✓             | ✓          | ✓    |                           |





**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK7DSCGGY400</b>   |                  |                   |                    |                  |
| Course Title   | <b>RESEARCH METHODOLOGY</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>  |                  |                   |                    |                  |
| Semester       | <b>VII</b>  |                  |                   |                    |                  |
| Academic Level | 400-499   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites | UK6DSCGGY300/UK6DSCGGY301/UK6DSCGGY302 /UK6DSCGGY303  |                  |                   |                    |                  |
| Course Summary | This course intend to develop research skills in data collection by sampling methods and report writing |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content  | Hrs |
|------------|--|--|-----|
| <b>I</b>   | <b>Research Methodology: An Introduction</b> |  | 9   |
|            | 1  | Research: Meaning, Objectives, Significance of research                        |     |
|            | 2  | Characteristics and types of research  |     |
|            | 3  | Research Problem: Selecting the problem, Necessity of defining the problem     |     |
| <b>II</b>  | <b>Research Design</b>                       |  | 9   |
|            | 4  | Research Design: Meaning and need for research design                          |     |
|            | 5  | Features of a good research design   |     |
|            | 6  | Hypothesis: Meaning, function and types  |     |
| <b>III</b> | <b>Data Collection and Sampling</b>          |  | 9   |
|            | 7  | Collection of Primary data   |     |
|            | 8  | Collection of Secondary data   |     |
|            | 9  | Characteristics of good sample; advantages and disadvantages                   |     |
|            | 10   | Probability sampling and Non-probability sampling                              |     |
| <b>IV</b>  | <b>Report Writing</b>                        |  | 9   |
|            | 11   | Types of Reports   |     |
|            | 12   | Significance of report writing   |     |
|            | 13   | Different steps in writing report  |     |
|            | 14   | Layout of the research report  |     |
|            | 15   | Bibliography, References   |     |
| <b>V</b>   | <b>Ethics and ICT Tools in Research</b>      |  | 9   |
|            | 16   | Plagiarism, Definition, Different forms, Consequences, Copy right infringement |     |
|            | 17   | Qualities of Good researcher   |     |
|            | 18   | ICT Tools for research: Role of computers in research                          |     |
|            | 19   | Maintenance of data using software such as Mendeley, Endnote                   |     |

## PRACTICALS

(30 Hours)

Exercise 1: Preparation of observation schedule and questionnaire

Exercise 2: Preparation of a research report

### References:

- C R Kothari, Gaurav Garg: Research Methodology Methods and Techniques - New Age India publishers
- R Krishnaswami, M Ranganathan: Methodology of Research in Social Sciences – Himalaya Publishing House
- Basil Gomez & John Paul Jones III(ed.): Research methods in Geography – A Critical Introduction, Wiley-Blackwell, London, 2010.
- Danier R Montello & Paul Sutton: An Introduction to Scientific Research Methods in Geography, Sage Publications, 2006. 3. Iain Hay : Qualitative Research Methods in Human Geography, Oxford University Press.
- Robin Flowerdew & David Lozell Martin: Methods in Human Geography – A Guide for students Doing a Research Project, Prentice Hall, 2005.
- Ram Ahuja: Research Methods – Rawat Publications
- H N Misra, Vijai P Singh: Research Methodology in Geography – Rawat Publications
- Ranjit Kumar: Research Methodology – SAGE TEXTS
- R Panneerselvam: Research Methodology – PHI Learning Private Limited

### WEB REFERENCE

- <https://library.sacredheart.edu/c.php?g=29803&p=185902>
- <https://www.discoverphds.com/blog/types-of-research>
- <https://www.simplilearn.com/what-is-data-collection-article>
- <https://www.investopedia.com/terms/s/sampling.asp>
- <https://www.skillsyouneed.com/write/report-writing.html>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the different types of research                 | U               | PSO-1         |
| CO-2 | Evaluate the characteristics of a good research design     | E               | PSO-1         |
| CO-3 | Create questionnaire and apply sampling methods            | Ap, C           | PSO-1, 3      |
| CO-4 | Understand to write a research report                      | U, C            | PSO-3         |
| CO-5 | Apply ICT tools and perform ethical values in research     | Ap              | PSO-3, 4      |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: RESEARCH METHODOLOGY**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO   | PO/PSO   | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|----------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the different types of research             | PSO-1    | U               | F                  | L                        | -             |
| 2      | Evaluate the characteristics of a good research design | PSO-1    | E               | C                  | L                        | -             |
| 3      | Create questionnaire and apply sampling methods        | PSO-1, 3 | Ap, C           | M                  | L                        | -             |
| 4      | Understand to write a research report                  | PSO-3    | U, C            | F                  | L                        | -             |
| 5      | Apply ICT tools and perform ethical values in research | PSO-3, 4 | Ap, C           | M                  | L                        | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|             | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|-------------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| <b>CO 1</b> | 3     | -     | -     | -     | 1    | -    | -    | 3    | -    | -    | -    | -    |
| <b>CO 2</b> | 3     | -     | -     | -     | 2    | -    | -    | 3    | -    | -    | -    | -    |
| <b>CO 3</b> | 3     | -     | 3     | -     | 3    | -    | -    | 3    | -    | 3    | 3    | -    |
| <b>CO 4</b> | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 2    | 3    | -    |
| <b>CO 5</b> | -     | -     | 2     | 3     | -    | -    | -    | -    | 3    | 3    | 3    | 3    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Project Evaluation | End Semester Examinations |
|------|---------------|------------|--------------------|---------------------------|
| CO 1 | ✓             | ✓          |                    | ✓                         |
| CO 2 | ✓             |            |                    | ✓                         |
| CO 3 | ✓             |            |                    | ✓                         |
| CO 4 | ✓             | ✓          | ✓                  | ✓                         |
| CO 5 | ✓             |            |                    |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK7DSCGGY401</b>  |                  |                   |                    |                  |
| Course Title   | <b>SPATIAL PLANNING</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | VII  |                  |                   |                    |                  |
| Academic Level | 400-499  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3                |                   | 2                  | 5                |
| Pre-requisites | UK6DSCGGY300/UK6DSCGGY301/UK6DSCGGY302 /UK6DSCGGY303   |                  |                   |                    |                  |
| Course Summary | This course focus on conceptual frame works of spatial planning with emphasise on land use planning, rural planning and development, urban planning, and regional planning. After completing the course, the learner will be able to apply the key concepts of spatial planning in various fields. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                    | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Introduction to Spatial planning</b> |   | 6   |
|            | 1                                       | Concept of space in geography   |     |
|            | 2                                       | Characteristics of space-types-absolute space-relative space and types of geographical space  |     |
|            | 3                                       | Planning- Meaning and types   |     |
|            | 4                                       | Spatial planning – Meaning-Benefits, Challenges & Goals, Principles of Spatial Planning, Roles and Responsibilities, Spatial Planning Process |     |
| <b>II</b>  | <b>Land use Planning</b>                |   | 10  |
|            | 5                                       | Land use survey and Land evaluation - Drivers of land use change  |     |
|            | 6                                       | Land capability classification – Land irrigability classification   |     |
|            | 7                                       | Land use classification - NRSC  |     |
|            | 8                                       | Land use planning-Goals-Focus-Benefits, 10 Steps in Land use planning, Contents of Land use plan, Land use Planning Applications              |     |
| <b>III</b> | <b>Rural Development Planning</b>       |   | 10  |
|            | 9                                       | Definition and Scope of Rural Planning  |     |
|            | 10                                      | Importance of Rural Planning in Sustainable Development   |     |
|            | 11                                      | Key Concepts and Principles in Rural Planning   |     |
|            | 12                                      | Rural development programmes in India-RADPFI Guidelines-  |     |
| <b>IV</b>  | <b>Urban planning</b>                   |   | 10  |
|            | 13                                      | Urban planning meaning and scope  |     |
|            | 14                                      | Urban ecology, Sustainable development goal and Urban environment   |     |
|            | 15                                      | Urban Modelling and Mapping: Automated mapping, Facility mapping and water sewage modelling   |     |
|            | 16                                      | Urban sprawl: Issue and challenges in India   |     |

|          |  | <b>Regional Planning</b>  |  |          |  |
|----------|--|---|--|----------|--|
| <b>V</b> | 17   | Meaning and types   |  | <b>9</b> |  |
|          | 18   | Delineation of planning region  |  |          |  |
|          | 19   | Theories and models – growth pole model of Perroux – Myrdal – Hirschman |  |          |  |
| 20       | Regional Planning in India: Centralized and Decentralized planning – Concept of Multi-level planning – Macro, Meso and Micro |   |  |          |  |

## **PRACTICALS**

**(30 Hours)**

**Exercise 1:** Land Use Planning of any one of the adjacent local bodies applying the 10 Steps in Land Use Planning proposed by FAO

**Exercise 2:** Preparation of land use map using Survey of India topographical sheet/Satellite images

## **References**

- "Thinking Geographically: Space, Theory and Contemporary Human Geography" by Brendan Bartley Publisher: Continuum Published Year: 2007
- "Regional Planning in India" by Mahesh Chand: -New Age International- 2010
- "Regional Planning: Development and Decentralization" by R.P. Misra: -Rawat Publication- 2007.
- "Regional Planning and Development in India" by R. C. Chandna - 2004 -Sterling Publishers Pvt. Ltd.
- "Land Use Planning and Zoning" by B.S. Bhadoria-Commonwealth Publishers-2010
- "Land Use Planning: A Casebook on the Use, Misuse and Re-Use of Urban Land" by H.S. Grewal-Oxford University Press-2009
- "Land Use and Urban Planning" by S. V. N. Rao- Tata McGraw-Hill Education-2005
- "Guidelines for land use Planning, Food and Agricultural Organization of United Nations-1993
- "Introduction to Land Use Planning and Zoning" by Carl J. Stephani and Douglas R. Porter-APA Planners Press-2011
- "The Urban Planning Process: A Beginner's Guide" by Philip R. Berke and David R. Godschalk-Routledge-2019
- "Urban and Regional Planning" by Peter Hall-Routledge-2014
- "Rural Planning and Development: Principles, Concepts, and Case Studies" by R. Satapathy-Pointer Publishers-2010
- "Rural Planning and Management" by B. B. Singh-Concept Publishing Company-2007
- "Rural Planning and Development" by Y. P. Singh and Ravi B. Singh-New Age International-2005

## **Web references**

- <https://www.sciencedirect.com/topics/social-sciences/spatial-planning>
- <https://panchayat.gov.in/spatial-planning-new/>
- [https://unece.org/fileadmin/DAM/hlm/documents/Publications/spatial\\_planning.e.pdf](https://unece.org/fileadmin/DAM/hlm/documents/Publications/spatial_planning.e.pdf)
- <https://tcp.tn.gov.in/regionalplans>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                               | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand the basic concepts of spatial planning  | U               | PSO-1         |
| CO-2 | Evaluate land use classification systems and approaches and preparation of land use plan | E, C            | PSO-3         |
| CO-3 | Analyse rural development plans and key concepts   | An              | PSO-2         |
| CO-4 | Understand the basic concepts of urban planning  | U               | PSO-1         |
| CO-5 | Evaluate regional planning process and theories  | E               | PSO-1,2       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: SPATIAL PLANNING**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the basic concepts of spatial planning  | PSO-1   | U               | C                  | L                        | -             |
| 2      | Evaluate land use classification systems and approaches and preparation of land use plan | PSO-3   | E, C            | P                  | L                        | P             |
| 3      | Analyse rural development plans and key concepts   | PSO-2   | An              | C                  | L                        | -             |
| 4      | Understand the basic concepts of urban planning  | PSO-1   | U               | P                  | L                        | -             |
| 5      | Evaluate regional planning process and theories  | PSO-1,2 | U, E            | M                  | L                        | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | -     | -     | 3     | -     | -    | 3    | -    | -    | -    | -    | -    | -    |
| CO 3 | -     | 1     | -     | -     | -    | 3    | -    | -    | -    | -    | -    | -    |
| CO 4 | 1     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 5 | -     | 2     | -     | -     | -    | 2    | -    | -    | -    | -    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Seminar | End Semester Examinations |
|------|---------------|------------|---------|---------------------------|
| CO 1 | ✓             | ✓          | ✓       | ✓                         |
| CO 2 | ✓             |            | ✓       | ✓                         |
| CO 3 | ✓             |            | ✓       | ✓                         |
| CO 4 | ✓             |            | ✓       | ✓                         |
| CO 5 | ✓             | ✓          | ✓       |                           |





**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK7DSCGGY402</b>  |                  |                   |                    |                  |
| Course Title   | <b>ENVIRONMENTAL MANAGEMENT AND IMPACT ASSESSMENT</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | VII  |                  |                   |                    |                  |
| Academic Level | 400-499  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites | UK6DSCGGY300/UK6DSCGGY301/UK6DSCGGY302 /UK6DSCGGY303   |                  |                   |                    |                  |
| Course Summary | This Course aims to provide strategies and techniques for managing the environment by maintaining environmental quality and sustainability. Moreover, methodological framework of Environmental Impact Assessment is also elaborated through modules |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content  | Hrs |
|------------|---|--|-----|
| <b>I</b>   | <b>Introduction to Environmental Management</b> |  | 6   |
|            | 1   | Introduction to Environment Management : Meaning And Components  |     |
|            | 2   | Principes, Strategies and Need of Environmental Management   |     |
|            | 3   | Environment-Development Debate :Environmental Sustainability   |     |
|            | 4   | Tools and Techniques of Environmental Management : Types & Methods   |     |
|            | 5   | Environmental Ethics : Principles and Approaches to Environmental ethics   |     |
| <b>II</b>  | <b>Environmental Quality</b>                    |  | 10  |
|            | 6   | Environmental Quality : Environmental Degradation and Manifestations:  |     |
|            | 7   | Land, Water and Air-Pollution Control vs. Pollution Prevention   |     |
|            | 8   | Stages and approaches of Pollution Prevention : Source reduction, Raw material substitution, Process modification                  |     |
|            | 9   | Environmental Quality indicators : Characteristics,Type I,Type II,Type III   |     |
| <b>III</b> | <b>Environmental Monitoring</b>                 |  | 10  |
|            | 10  | Environmental Monitoring : Objectives,approaches and Importance  |     |
|            | 11  | Types of Environmental Monitoring : Air Monitoring,Water Monitoring,Soil Monitoring,Biodiversity Monitoring : Tools and Techniques |     |
|            | 12  | Role of GIS and Remote Sensing in Environmental Monitoring   |     |

|           |    | <b>Environmental Impact Assessment</b>  |  |    |
|-----------|----|---|--|----|
| <b>IV</b> | 13 | Environmental Impact Assessment: The Need for EIA - The EIA Cycle and Procedures - Components of EIA  |  | 10 |
|           | 14 | EIA Methodologies: Criteria for the selection of EIA methodology, impact identification, impact measurement, impact interpretation & Evaluation, impact communication |  |    |
|           | 15 | Methods : Adhoc methods, Checklists methods, Matrices methods, Networks methods, Overlays methods, Cost/benefit analysis  |  |    |
|           | 16 | Rapid assessment of Pollution sources method, Simulation methods<br>Predictive models for impact assessment   |  |    |
|           |    | <b>Reviewing the EIA</b>  |  |    |
| <b>V</b>  | 17 | Reviewing the EIA Report: Construction Stage Impacts-Project Resource Requirements and Related Impacts  |  | 9  |
|           | 18 | Socio-economic Impacts, Ecological Impacts, Occupational Health Impact, Major Hazard/ Risk Assessment   |  |    |
|           | 19 | Integrated Impact Assessment : Review of EMP and Monitoring   |  |    |
|           | 20 | Environmental Management Plan-Mitigation Plans-Relief, Rehabilitation.  |  |    |

## **PRACTICALS**

**(30 Hours)**

**Exercise 1:** Visit to the environmentally degraded area and investigate causes of degradation. Prepare a report based on field investigation.

**Exercise 2:** Estimating carbon footprint in any local area site.

## **References**

- Canter, L.W., Environmental Impact Assessment, Mc Graw Hill Pub. Co., 1997.
- David P. Lawrence, Environmental Impact Assessment: Practical Solutions to Recurrent Problems, John Wiley & Sons, 2003.
- Hosetti B. B. & Kumar Eds A., Environmental Impact Assessment and Management, Daya Publishing House, 1998.
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## **Web references**

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- <https://www.niehs.nih.gov/about/stewardship/faq>
- <https://www.sciencedirect.com/topics/social-sciences/environmental-management>
- <https://www.worldbank.org/en/news/feature/2011/09/22/environmental-management-india>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to   | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Understand principles and strategies of Environmental Management and appraise tools and techniques of Environmental Management | U,E             | PSO-1         |
| CO-2 | Acquire knowledge about various methods of Pollution and assessing Test Environmental Quality using different indicators       | U ,Ap           | PSO-1,6       |
| CO-3 | Analyse various techniques of environmental monitoring   | An, C           | PSO-2         |
| CO-4 | Evaluate environmental impacts of projects   | E               | PSO-1         |
| CO-5 | Appraise mitigation plans and Review EIA reports   | E               | PSO-1         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: ENVIRONMENTAL MANAGEMENT AND IMPACT ASSESSMENT**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO   | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L) /Tutorial (T) | Practical (P) |
|--------|--|---------|-----------------|--------------------|---------------------------|---------------|
| 1      | Understand principles and strategies of Environmental Management and appraise tools and techniques of Environmental Management | PSO-1   | U,E             | F,C                | L                         |               |
| 2      | Acquire knowledge about various methods of Pollution and assessing Test Environmental Quality using different indicators       | PSO-1,6 | U ,Ap           | C,P                | L                         | P             |
| 3      | Analyse various techniques of environmental monitoring   | PSO-2   | An, C           | M                  | L                         |               |
| 4      | Evaluate environmental impacts of projects   | PSO-1   | E               | M                  | L                         |               |
| 5      | Appraise mitigation plans and Review EIA reports   | PSO-1   | E               | P ,M               | L                         | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

### Mapping of COs with PSOs and POs

|      | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 2 | 3    | -    | 3    | -    | 3   | -   | -   | -   | -   | 3   | -   | -   |
| CO 3 | 3    | -    | -    | -    | -   | 3   | -   | -   | -   | -   | -   | -   |
| CO 4 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 5 | 3    | -    | -    | -    | 3   | -   | -   | -   | -   | -   | -   | -   |

### Assessment Rubrics:

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

### Mapping of COs to Assessment Rubrics:

|      | Internal Exam | Assignment | Seminar | End Semester Examinations |
|------|---------------|------------|---------|---------------------------|
| CO 1 | ✓             | ✓          | ✓       | ✓                         |
| CO 2 | ✓             | ✓          | ✓       | ✓                         |
| CO 3 | ✓             | ✓          | ✓       | ✓                         |
| CO 4 | ✓             | ✓          | ✓       | ✓                         |
| CO 5 | ✓             | ✓          | ✓       |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK7DSCGGY300</b>   |                  |                   |                    |                  |
| Course Title   | <b>MAP READING AND ANALYSIS</b>                                 |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>  |                  |                   |                    |                  |
| Semester       | VII   |                  |                   |                    |                  |
| Academic Level | 300-399   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2                  | 5                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | The course deals with the history and development of map making |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                         | Content   | Hrs |
|------------|------------------------------|---|-----|
| <b>I</b>   | <b>Introduction to Maps</b>  |   | 6   |
|            | 1                            | Cartography : Meaning, Nature Scope   |     |
|            | 2                            | History of Map making : Ancient, Medieval, Modern Period  |     |
|            | 3                            | Maps : Meaning-Types based on Scale and Purpose   |     |
| <b>II</b>  | <b>Land Surveying</b>        |   | 10  |
|            | 4                            | Land Surveying: Introduction - Principles - Objectives - Uses   |     |
|            | 5                            | Stages of survey operations - Linear Measurement  |     |
|            | 6                            | Distance measurement devices: Chain, tape – Merits and demerits                                       |     |
|            | 7                            | Table Surveying: Definition, Principles, Accessories  |     |
| <b>III</b> | <b>Topographic Surveying</b> |   | 10  |
|            | 8                            | Introduction of Topographic Surveying: History, Importance, Applications                              |     |
|            | 9                            | Challenges and Limitations to Topographic Surveying   |     |
|            | 10                           | Different methods of representing Relief :<br>Hachures, Formlines, Spot heights, Benchmarks, Contours |     |
| <b>IV</b>  | <b>Topographical Maps</b>    |   | 10  |
|            | 11                           | Topographical Maps : Conventional signs and Symbols, Scale ,  |     |
|            | 12                           | Survey of India Maps : Numbering and Layout of SOI Toposheets   |     |
|            | 13                           | Representation of Physical and Cultural features in Topographical Maps                                |     |

|          |    | <b>Geospatial Technologies in Map Making</b>   |  |   |  |
|----------|----|--|--|---|--|
| <b>V</b> | 14 | Aerial Photography: Procedures of Aerial Surveying –Types of Aerial Photographs-Advantages and Disadvantages |  | 9 |  |
|          | 15 | Satellite Remote Sensing: History, Components, Application-IRS missions                                      |  |   |  |
|          | 16 | GIS: Meaning and Components, Applications  |  |   |  |

## **PRACTICALS**

**(30 Hours)**

Exercise 1: Conventional signs and symbols

Exercise 2: Interpretation of toposheets: 1:50,000

## **References**

- Misra R P and Ramesh A, (1989) Fundamentals of Cartography. Concept Publishing Company, New Delhi.
- Robinson A H et al, (1995) Elements of Cartography, Wiley.
- Jan Kraak, Menno and OrmelingFerjan (2003) Cartography: Visualization of Geospatial Data, Prentice Hall.
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- Monkhouse and Wilkinson: Maps and Diagrams, Methuen and Company.
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- Ian F Mahaney: Topographic Maps, Power Kids Press
- Nelson Petrie: Analysis and Interpretation of Topographic Maps, Orient BlackswanPvt. Ltd.

## **Web references**

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- <https://mjslandsurvey.com/faqs/what-is-included-in-topographic-survey/>
- <https://www.gim-international.com/knowledge-field/land-surveying-and-topography>
- [www.nwcg.gov/](http://www.nwcg.gov/)
- <http://geology.isu.edu/>
- <http://www.nrm.qld.gov.au/>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                              | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understand the scientific and artistic blending Cartography                             | R ,U            | PSO-1         |
| CO-2 | Acquire knowledge about various aspects of Table surveying, its principles and methods. | U,C             | PSO-1,3       |
| CO-3 | Analyse various methods of relief representation  | An, C           | PSO-1,3       |
| CO-4 | Evaluate physical and cultural features of Topographic maps                             | E, C            | PSO-1         |
| CO-5 | Apply geospatial technology in map making   | Ap,C            | PSO-1,3       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: MAP READING AND ANALYSIS**

**Credits: 4 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the scientific and artistic blending Cartography                             | PSO-1   | R ,U            | F                  | L                        |               |
| 2      | Acquire knowledge about various aspects of Table surveying, its principles and methods. | PSO-1,3 | U,C             | F,C                | L                        |               |
| 3      | Analyse various methods of relief representation  | PSO-1,3 | An, C           | C,P,M              | L                        | P             |
| 4      | Evaluate physical and cultural features of Topographic maps                             | PSO-1   | E, C            | C,P,M              | L                        | P             |
| 5      | Apply geospatial technology in map making   | PSO-1,3 | Ap,C            | P,M                | L                        |               |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | -     | 3     | -     | 3    | -    | -    | -    | -    | 3    | -    | -    |
| CO 3 | 3     | -     | 3     | -     | 3    | -    | -    | -    | -    | 3    | -    | -    |
| CO 4 | 3     | -     | -     |       | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 5 | 3     | -     | 3     | -     | 3    | -    | -    | -    | -    | -    | 3    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Seminar | End Semester Examinations |
|------|---------------|------------|---------|---------------------------|
| CO 1 | ✓             | ✓          | ✓       | ✓                         |
| CO 2 | ✓             | ✓          | ✓       | ✓                         |
| CO 3 | ✓             | ✓          | ✓       | ✓                         |
| CO 4 | ✓             | ✓          | ✓       | ✓                         |
| CO 5 | ✓             | ✓          | ✓       |                           |





**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK7DSCGGY301</b>  |                  |                   |                    |                  |
| Course Title   | <b>EARTH POSITIONING SYSTEMS</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | VII  |                  |                   |                    |                  |
| Academic Level | 300-399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | This course focus on the concepts of Space and location, Modern techniques assisting navigation, basics of geodesy, components of GPS and other Earth positioning systems and their applications |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content  | Hrs |
|------------|--|--|-----|
| <b>I</b>   | <b>Introduction to Earth Positioning Systems</b> |  | 9   |
|            | 1  | Introduction to Earth Positioning Systems : History and Development – Navstar GPS - Kepler’s Law - Doppler effect -Positioning concept - Transit, Timation     |     |
|            | 2  | Earth Positioning Systems : NavIC, Glonass, Galileo,Beidou   |     |
|            | 3  | Applications and Limitations of GPS  |     |
| <b>II</b>  | <b>Basic Geodesy</b>                             |  | 9   |
|            | 4  | Basic Geodesy: Geoid /datum/ Ellipsoid-Definition and basic concepts, Spatial Referencing system, Map Scale, Scale factors                                     |     |
|            | 5  | Land Surveying : Classification -Topographic Surveying and Mapping - Triangulation - Traversing - Benchmarks -Contouring                                       |     |
| <b>III</b> | <b>Components of GPS</b>                         |  | 9   |
|            | 6  | GPS Design & Objectives : Components of GPS- Space Segment- Control Segment-User Segment   |     |
|            | 7  | Satellite Configuration-Orbit determination-GPS Error and Accuracy   |     |
|            | 8  | GPS Signal Structure and Characteristics : Structure of GPS Signal, Frequency, P Code, C/A code and data format - Generation of C/A code -Navigation data bits |     |
|            | 9  | GPS receiver: Types and Structure of receivers, Principles of GPS position fixing- Pseudo Ranging  |     |
| <b>IV</b>  | <b>GPS Survey Methods and Data Processing</b>    |  | 9   |
|            | 10   | GPS Survey Methods: Single Point or Point Vs. Relative, Static Vs. Kinematic, Real time Vs. Post mission.  |     |
|            | 11   | GPS Survey field procedures: Code and Carrier-based positioning, Accuracy and recording time   |     |
|            | 12   | GPS Data Processing : Ambiguity resolution-Post processing-Real time processing-Accuracy measures-Software modules   |     |

|   |   |  |   |
|---|---|--|---|
|   | 13  | GPS and Geographic Information System integration                    |   |
| V | <b>Navigation with Indian Constellation</b> |  | 9 |
|   | 14  | NavIC : Development- Space segment- Ground segment                   |   |
|   | 15  | IRNSS series satellites - GPS Aided Geo Augmented Navigation (GAGAN) |   |

## PRACTICALS

(30 Hours)

**Exercise 1:** Using GPS with map & compass

**Exercise 2:** Area calculation by GPS

**Exercise 3:** Navigation by way points, track points

**Exercise 4:** Transfer of Way points, track points

**Exercise 5:** Map preparation

(Field Work: Exercises 1-4)

## References

- G. S. Rao, 2010. Global Navigation Satellite Systems. Tata McGraw Hill Education Pvt. Ltd.
- Guocheng Xu, 2003. "GPS Theory, Algorithms and Applications" Springer
- Gunter Seeber, 1993. Satellite Geodesy, Copy Right 2003
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- Alfred Leick, 2004. GPS Satellite Surveying, 3rd Edition, John Wiley and Sons
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- Mishra R.P and Ramesh A. 1989: Fundamentals of Cartography. Concept Publishing
- Nag P. and Kudrat M. 1998: Digital Remote Sensing. Concept Publication
- Rampal K.K. 1993: Mapping and compilation. Concept publication
- Robinson A., 2002: Elements of Cartography. John Wiley
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## Web References

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- <https://geo.libretexts.org>
- <https://natural-resources.canada.ca>
- <https://oceanservice.noaa.gov>
- <https://serc.carleton.edu>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                     | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Discuss Concept, History of Earth Positioning System                           | U               | PSO-1         |
| CO-2 | Classify Land and Differential Survey methods                                  | Ap              | PSO-3         |
| CO-3 | Comprehend various segments of GPS system                                      | U               | PSO-1         |
| CO-4 | Implement suitable techniques of GPS survey<br>Develop GPS and GIS integration | Ap,<br>C        | PSO-3         |
| CO-5 | Understanding Navigation with Indian Constellation                             | U               | PSO-1         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: EARTH POSITIONING SYSTEMS**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO   | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/ Tutorial (T) | Practical (P) |
|--------|--|--------|-----------------|--------------------|---------------------------|---------------|
| 1      | Discuss Concept, History of Earth Positioning System                           | PSO-1  | F               | U                  | L                         | -             |
| 2      | Classify Land and Differential Survey methods                                  | PSO-3  | P               | Ap                 | L                         | -             |
| 3      | Comprehend various segments of GPS system                                      | PSO-1  | C               | U                  | L                         | -             |
| 4      | Implement suitable techniques of GPS survey<br>Develop GPS and GIS integration | PSO-3  | M               | Ap,<br>C           | -                         | P             |
| 5      | Understanding Navigation with Indian Constellation                             | PSO-1  | F               | U                  | -                         | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | 3    | -    | 3    | 3    | -    |
| CO 2 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 3 | 3     | -     | -     | -     | 3    | -    | -    | 3    | -    | 3    | 3    | -    |
| CO 4 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |
| CO 5 | -     | -     | 3     | -     | -    | -    | -    | -    | -    | 3    | 3    | -    |

**Assessment Rubrics:**

- Quiz/Assignment/Discussion/ Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Project Evaluation | End Semester Examinations |
|------|---------------|------------|--------------------|---------------------------|
| CO 1 | ✓             | ✓          |                    | ✓                         |
| CO 2 | ✓             |            |                    | ✓                         |
| CO 3 | ✓             |            |                    | ✓                         |
| CO 4 | ✓             | ✓          |                    | ✓                         |
| CO 5 |               |            |                    |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK7DSCGGY302</b>  |                  |                   |                    |                  |
| Course Title   | <b>GEOGRAPHY OF ENVIRONMENT</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>   |                  |                   |                    |                  |
| Semester       | VII  |                  |                   |                    |                  |
| Academic Level | 300-399  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | This paper highlights the importance of environment on human life. It constitutes different environmental approaches, ecosystem, bio-geo chemical cycles, bio-diversity conservation, environmental issues and major environmental movements in India. |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content  | Hrs |
|------------|---|--|-----|
| <b>I</b>   | <b>Introduction</b>                                     |  | 6   |
|            | 1   | Environmental Geography-Meaning-Nature-Scope   |     |
|            | 2   | Ecosystem-Structure-Components-Function  |     |
|            | 3   | Trophic level-Energy Functions.  |     |
| <b>II</b>  | <b>Environmental Issues</b>                             |  | 10  |
|            | 4   | Pollution –Meaning-Classification  |     |
|            | 5   | Global warming-Causes -Consequences  |     |
|            | 6   | Ozone depletion-Causes-Impacts-Mitigation measures   |     |
| <b>III</b> | <b>Environmental Movements in India</b>                 |  | 10  |
|            | 8   | Chipko Movement- Narmada Bachao Andolan  |     |
|            | 9   | Silent Valley movement   |     |
| <b>IV</b>  | <b>International Initiatives to Protect Environment</b> |  | 10  |
|            | 10  | Club of Rome-Limits to Growth  |     |
|            | 11  | Stockholm Conference 1972  |     |
|            | 12  | Vienna Convention 1985-Montreal Protocol –Rio- Summit- Rio+5,Rio+10-Agenda 21-Kyoto Protocol –Copenhagen Summit  |     |
| <b>V</b>   | <b>Environmental Protection Initiatives In Kerala</b>   |  | 9   |
|            | 13  | The Kerala Land Conservancy Act,1957-Kerala Protection Of River Banks And Regulation Of Removal of Sand Act,2001 |     |
|            | 14  | The Kerala Conservation of Paddy Land and Wetland Act 2008- The Biological Diversity Act, 2002.                  |     |

## PRACTICALS

(30 hours)

**Exercise 1:** Mapping the environmental issues in the selected stretch of the nearest river/tributary using cadastral maps through field work.

### References

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- Cunningham, W. P., and Cunningham, M. A., (2004). Principles of Environmental Science: Inquiry and Applications, Tata McGraw-Hill, New Delhi.
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- <https://www.nou.ac.in/tps://ebooks.inflibnet.ac.in/geop06/chapter/possibilism-in-geography/>
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- <https://ebooks.inflibnet.ac.in/geop06/chapter/determinism-in-geography/>
- <https://www.ugc.gov.in/oldpdf/modelcurriculum/Chapter4.pdf>
- <https://www.cbd.int/impact/whatis.shtml>
- <https://www.cseindia.org/understanding-eia-383>
- <https://www.britannica.com/explore/savingearth/chipko-movement>
- <https://www.fao.org/3/R0465E/r0465e03.html>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to | Cognitive Level | PSO addressed |
|------|--|-----------------|---------------|
| CO-1 | Students familiarize with fundamentals concepts in         | R,U             | PSO-1         |

|      |  |         |         |
|------|--|---------|---------|
|      | Geography of environment   |         |         |
| CO-2 | Understands the major environmental problems                             | R,U, An | PSO-1,2 |
| CO-3 | Students will learn about environmental movements in India.              | U, An   | PSO-1,4 |
| CO-4 | Analyses different international initiatives to protect the environment. | An, E   | PSO-1   |
| CO-5 | Analyses important Acts in Kerala to protect the environment             | U,C     | PSO-2,3 |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: ENVIRONMENTAL GEOGRAPHY**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO  | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/ Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|---------------------------|---------------|
| 1      | Students familiarize with fundamentals concepts in Geography of environment | PSO-1   | R,U             | F                  | L                         |               |
| 2      | Understands the major environmental problems                                | PSO-1,2 | R,U, An         | F ,C               | L                         |               |
| 3      | Students will learn about environmental movements in India                  | PSO-1,4 | U, An           | C ,M               | L                         | p             |
| 4      | Analyses different international initiatives to protect the environment     | PSO-1   | An, E           | F , M              | L                         | p             |
| 5      | Analyses important Acts in Kerala to protect the environment                | PSO-2,3 | An, E           | F , M              | L                         |               |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3     | -     | -     | -     | 3    | -    | -    | -    | -    | -    | -    | -    |
| CO 2 | 3     | 3     | -     | -     | 3    | 3    | -    | -    | -    | -    | -    | -    |

|      |   |   |   |   |   |   |   |   |   |   |   |   |
|------|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 3 | 3 | - | - | 3 | 3 | 3 | - | - | - | - | - | - |
| CO 4 | 3 | - | - |   | 3 | - | - | - | - | - | - | 3 |
| CO 5 | - | 3 | 2 | - | - | - | 3 | - | - | - | - | - |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             | ✓          |            | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             | ✓          |            |                           |





## University of Kerala

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK7DSEGGY400</b>   |                  |                   |                    |                  |
| Course Title   | <b>SPATIAL DATA ANALYSIS AND GEOSTATISTICS</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>  |                  |                   |                    |                  |
| Semester       | <b>VII</b>  |                  |                   |                    |                  |
| Academic Level | 400-499   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | This course focus on advanced methods of Spatial Data Analysis for solving real world problems. Integrating statistical tools and techniques in spatial data analysis, the learner will be able to create spatial models for representing geographic phenomena and processes. |                  |                   |                    |                  |

### Detailed Syllabus:

| Module     | Unit   | Content  | Hrs       |
|------------|--|--|-----------|
| <b>I</b>   | <b>Fundamentals of Spatial Analysis</b>                              |  | <b>15</b> |
|            | 1  | Introduction to Spatial Analysis : Concept, Scope and Advantages   |           |
|            | 2  | Fundamental Spatial Analysis : Spatial Query, Spatial Join   |           |
|            | 3  | Point Pattern Analysis : Geometric Measurements, Quadrat Count Analysis, Kernel Density Analysis, Nearest Neighbour Analysis |           |
| <b>II</b>  | <b>Spatial Data Analysis : Line, Area and Network</b>                |  | <b>15</b> |
|            | 5  | Line Data Analysis : (Line Length, Line Density, Line Direction, Line Orientation)   |           |
|            | 6  | Areal Analysis : Spatial Autocorrelation, Joint Count  |           |
|            | 7  | Network Analysis : Routing, Service Area, Closest Facilities, O-D Cost Matrix  |           |
| <b>III</b> | <b>Time Series and 3-D analysis</b>                                  |  | <b>15</b> |
|            | 9  | Time Series Analysis : Definition, Types, Models and Techniques  |           |
|            | 10   | 3-D Analysis : Draping, Extrusion, Line-of-Sight, Viewshed, Skylines, Volumetric Analysis, Animation                         |           |
| <b>IV</b>  | <b>Basics of Geostatistics</b>                                       |  | <b>15</b> |
|            | 18   | Geostatistics : Meaning, Scope, Approaches, Geostatistics vs interpolation   |           |
|            |  | Fundamentals of Statistics and Probability : An Overview   |           |
|            | 19   | Univariate Analysis : Univariate Plots-Hypothesis Tests, Measures of Heterogeneity   |           |
|            |  | Bivariate Analysis : Correlation Coefficient, Covariance Regression and Curve Fitting-Scatterplot or Cross plot              |           |
| 20         | Multivariate Analysis, Gaussian Distribution & Central Limit Theorem |  |           |
| <b>V</b>   | <b>Spatial Data Modeling</b>   |  | <b>15</b> |
|            | 23   | Characterization of spatial processes: Variogram and covariance- Spatial   |           |

|    |   |  |
|----|---|--|
|    | correlation-  |  |
|    | Spatial Interpolation : Proximity Interpolation- Inverse Distance Weighted- Trend Surfaces- Kriging- Co-Kriging -Uncertainty Analysis |  |
| 24 | Stochastic simulation Modelling : Components and Applications   |  |

## PRACTICAL

(30 Hours)

**Exercise 1:** Spatial Query and Spatial Joins

**Exercise 2:** Point Pattern Analysis

**Exercise 3:** Spatial Autocorrelation

**Exercise 4:** Time Series Analysis

**Exercise 5:** Spatial Interpolation

## References

- O’Sullivan, David and David J. Unwin (2010), Geographic Information Analysis, 2nd Edition, John Wiley & Sons.
- Mitchel, Andy. The Esri Guide to GIS Analysis (three volumes), Esri Press. 1999. Volume 1: Geographic Patterns and Relationships 2005. Volume 2: Spatial Measurements and Statistics 2012. Volume 3: Modeling Suitability, Movement, and Interaction
- de Smith, MJ, MF Goodchild and PA Longley, 2006-2011. Geospatial Analysis: A Comprehensive Guide to Principles, Techniques and Software Tools, 3rd Edition.
- Kemp, K.K., ed. 2008. Encyclopedia of Geographic Information Science, Sage Publications.
- Chiles, J. P. and Delfiner, P., 1999, Geostatistics-Modeling Spatial Uncertainty. Wiley Series in Probability and Statistics.
- Trauth, M. H., 2015, MATLAB Recipes for Earth Sciences. Springer-Verlag Berlin Heidelberg.
- Isaacs, E. H. and Srivastava, R. M., 1989, An Introduction to Applied Geostatistics. Oxford University Press.
- Jensen, J. R., Lake, L. W., Corbett P. M. W., and Goggin, D. J., 2000, Statistics for Petroleum Engineers and Geoscientists, Elsevier.
- McKillup, S. and Dyar, M. D., 2010, Geostatistics Explained: An Introductory Guide for Earth Scientists. Cambridge University Press.
- Middleton, G., 2000, Data Analysis in the Earth Sciences using Matlab. Prentice Hall Inc.
- James, G., Witten, D., Hastie, T., and Tibshirani, R., 2017, An Introduction to Statistical Learning: with Applications in R. Springer.
- R.A. Olea, 1999, Geostatistics for Engineers and Earth Scientists, Kluwer Academic Publishers

## Web References

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- <https://mgimond.github.io>
- <https://rspatial.org>
- <https://geofaculty.uwyo.edu>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to  | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Explain how point patterns can be identified and understood as realizations of spatial processes. & Outline various ways that overlay is implemented in GIS.  | U,R             | PSO-1         |
| CO-2 | Evaluate how linear feature concepts of length, direction and connection are represented and analyzed in networks & Apply and critically interpret appropriate methods for the analysis of geographical information | U,E             | PSO-3         |
| CO-3 | Understand several emerging geographical analysis techniques using temporal and 3D analysis   | U               | PSO-1         |
| CO-4 | Apply various statistical techniques useful for spatial data analysis   | Ap              | PSO-3         |
| CO-5 | Analyse Quantify spatially distributed data in terms of spatial statistics estimate and model the Variogram / covariance & Create spatial models to explain patterns and distribution of geographic phenomena       | An,C            | PSO-3         |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: SPATIAL DATA ANALYSIS AND GEOSTATISTICS**

**Credits:4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO  | PO/PSO | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|--------|-----------------|--------------------|--------------------------|---------------|
| 1      | Explain how point patterns can be identified and understood as realizations of spatial processes & Outline various ways that overlay is implemented in GIS. | PSO-1  | U,R             | F                  | L                        | -             |
| 2      | Evaluate how linear feature concepts of length, direction and connection are represented and analyzed in networks & Apply and                               | PSO-3  | U,E             | P                  | L                        | -             |

|   |   |        |      |   |   |   |
|---|---|--------|------|---|---|---|
|   | critically interpret appropriate methods for the analysis of geographical information   |        |      |   |   |   |
| 3 | Understand several emerging geographical analysis techniques using temporal and 3D analysis   | PSO -1 | U    | F | L | - |
| 4 | Apply various statistical techniques useful for spatial data analysis   | PSO -3 | Ap   | M | - | P |
| 5 | Analyse Quantify spatially distributed data in terms of spatial statistics estimate and model the Variogram / covariance & Create spatial models to explain patterns and distribution of geographic phenomena | PSO -3 | An,C | M | - | P |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|      | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|------|-------|-------|-------|-------|-----|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | 3     | -     | -     | -     | 3   | -   | -   | 3   | -   | -   | -   | -   |
| CO 2 | -     | -     | 3     | -     | -   | -   | -   | -   | -   | 3   | 3   | -   |
| CO 3 | 3     | -     | -     | -     | 3   | -   | -   | -   | -   | -   | -   | -   |
| CO 4 | -     | -     | 3     | -     | -   | -   | -   | -   | -   | 3   | 3   | -   |
| CO 5 | -     | -     | 3     | -     | -   | -   | -   | -   | -   | 3   | 3   | -   |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             | ✓          |            | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            | ✓          | ✓                         |
| CO 4 | ✓             | ✓          | ✓          | ✓                         |
| CO 5 | ✓             |            |            |                           |



**University of Kerala**

|                |   |                  |                   |                    |                  |
|----------------|---|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>  |                  |                   |                    |                  |
| Course Code    | <b>UK7DSEGGY401</b>   |                  |                   |                    |                  |
| Course Title   | <b>DIGITAL SURVEYING</b>  |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>  |                  |                   |                    |                  |
| Semester       | VII   |                  |                   |                    |                  |
| Academic Level | 400-499   |                  |                   |                    |                  |
| Course Details | Credit  | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4   | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |   |                  |                   |                    |                  |
| Course Summary | This Course focus on Advanced methods of Land Surveying including Differential GPS, Electronic Theodolite and LiDAR |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                                      | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Introduction to Advanced Surveying</b> |   | 9   |
|            | 1   | Advanced surveying : Nature and Scope,objectives.Concepts, Importance,  |     |
|            | 2   | Comparison with conventional surveying-Applications   |     |
|            | 3   | EDM surveying : Principles of EDM-Digital level-Electronic Theodolite   |     |
|            | 4   | Types of EDM : Infrared, Microwave and Visible Light Instruments  |     |
| <b>II</b>  | <b>Differential GPS (DGPS)</b>            |   | 9   |
|            | 5   | Introduction to Differential GPS (DGPS): Principle, Concepts,Function   |     |
|            | 6   | Dual and Single Frequency DGPS, RTK and Static Surveys in DGPS  |     |
|            | 7   | Use of DGPS in Topographical Survey, Base, Rover, DGPS Connections and Settings   |     |
| <b>III</b> | <b>Total Station Survey</b>               |   | 9   |
|            | 8   | Introduction to Total Station: Principle and Function, REM, RDM   |     |
|            | 9   | Vertical and horizontal angle measurement mechanism of Total Station  |     |
|            | 10  | Open and close traversing using Total Station -Stakeout Concept in TS   |     |
|            | 11  | Use of Total station for Data processing and Analysis   |     |
| <b>IV</b>  | <b>LiDAR Mapping</b>                      |   | 9   |
|            | 12  | LiDAR Mapping Principles : LiDAR Point Positioning,LiDAR Error Sources and their Impact- LiDAR System Calibration   |     |
|            | 13  | LiDAR Data Quality Control-LiDAR Data Structuring   |     |
|            | 14  | LiDAR Data Characterization - LiDAR Data Downsampling   |     |
|            | 15  | LiDAR Data Segmentation-Digital Terrain Model Generation-Point Cloud Registration- LiDAR Applications   |     |
| <b>V</b>   | <b>Applications of Digital Surveying</b>  |   | 9   |
|            | 16  | Application areas of Digital Surveying : Cadastral and Control Surveying-Engineering-Mining-Defence-Forestry-Natural resource management-Urban Planning- Topographic Survey |     |

## Practical

(30 Hours)

**Exercise 1:** Topographical Survey using Differential GPS (Field Work)

**Exercise 2 :** Total Station Survey (Field Work)

**Exercise 3 :** UAS-based mapping project using LiDAR (Field Work)

## References

- Satheesh Gopi, R. Sathikumar and N. Madu, 2007. Advanced Surveying, Pearson.
- S. K. Duggal, 2013. Surveying, McGraw Hill Education (India).
- Ndukwe K. Ndukwe, 2001. Digital Technology in Surveying and Mapping, RhyceKerex Publishers.
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- Maune, D. F., ed. 2007. Digital Elevation Model Technologies and Applications: The DEM Users Manual. 2nd edition. Bethesda, MD. American Society for Photogrammetry and Remote Sensing. ISBN 1-57083-082-7.
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- Shan, J. and C. Toth, ed. 2008. Topographic Laser Ranging and Scanning, Principles and Processing. Boca Raton, FL. Taylor & Francis Group. ISBN 9781420051421.
- Wolf, P., B. Dewitt, B. Wilkerson. 2014. Elements of Photogrammetry, 4th edition. Boston. McGraw-Hill. ISBN 978-0071761123.

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- <https://www.esri.com>
- <https://gssc.esa.int>
- <https://cpe.leica-geosystems.com>
- <https://geospatial.trimble.com>

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                        | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Outline the principles of of Digital surveying and use of various EDM instruments | U               | PSO-1         |
| CO-2 | Devise Topographic Surveys using Differential GPS                                 | C               | PSO-3         |
| CO-3 | Plan Total Station Survey, analyse the data generated                             | C,An            | PSO-3         |
| CO-4 | Summarize and apply principles of LiDAR mapping                                   | U,Ap            | PSO-1         |
| CO-5 | Discuss the application areas of Digital Surveying                                | U               | PSO-1,3       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: DIGITAL SURVERYING**

**Credits: 4:0:0 (Lecture:Tutorial:Practical)**

| CO No. | CO   | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Outline the principles of Digital surveying and use of various EDM instruments | PSO-1   | U               | F                  | L                        | -             |
| 2      | Devise Topographic Surveys using Differential GPS                              | PSO-3   | C               | P                  | L                        | -             |
| 3      | Plan Total Station Survey, analyse the data generated                          | PSO-3   | C,An            | P                  | L                        | -             |
| 4      | Summarize and apply principles of LiDAR mapping                                | PSO-1   | U,Ap            | M                  | -                        | P             |
| 5      | Discuss the application areas of Digital Surveying                             | PSO-1,3 | U               | C                  | -                        | P             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**



**Mapping of COs with PSOs and POs :**

|      | PSO1 | PSO2 | PSO3 | PSO4 | PO1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|------|------|------|------|-----|------|------|------|------|------|------|------|
| CO 1 | 3    | -    | -    | -    | 2   | -    | -    | 3    | -    | -    | -    | -    |
| CO 2 | -    | -    | 3    | -    | -   | -    | -    | -    | -    | 2    | 3    | -    |
| CO 3 | -    | -    | 3    | -    | -   | -    | -    | -    | -    | 2    | 3    | -    |
| CO 4 | 3    | -    | -    | -    | 2   | -    | -    | 3    | -    | -    | -    | -    |
| CO 5 | 3    | -    | 2    | -    | 2   | 3    | -    | -    | -    | 3    | 3    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Project Evaluation | End Semester Examinations |
|------|---------------|------------|--------------------|---------------------------|
| CO 1 | ✓             | ✓          |                    | ✓                         |
| CO 2 | ✓             |            |                    | ✓                         |
| CO 3 | ✓             |            |                    | ✓                         |
| CO 4 | ✓             | ✓          | ✓                  | ✓                         |
| CO 5 |               |            |                    | ✓                         |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK7DSEGGY402</b>  |                  |                   |                    |                  |
| Course Title   | <b>DISASTERS AND ENVIRONMENTAL STRATEGIC ASSESSMENT</b>                                |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | VII  |                  |                   |                    |                  |
| Academic Level | 400-499  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | It deals with the various aspects of EIA, ESA, environmental management and monitoring |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit   | Content   | Hrs |
|------------|--|---|-----|
| <b>I</b>   | <b>Introduction to EIA</b>                       |   | 10  |
|            | 1  | Environmental Impact Assessment (EIA): Definitions and concepts                                   |     |
|            | 2  | Rationale and Historical Development of EIA   |     |
|            | 3  | Scope and methodologies of EIA  |     |
|            | 4  | Steps in conducting EIA   |     |
| <b>II</b>  | <b>Introduction to ESA</b>                       |   | 8   |
|            | 6  | Environmental Strategic Assessment (ESA): Definition and importance                               |     |
|            | 7  | ESA: Aims – Procedure – Approach- Methodology   |     |
| <b>III</b> | 8  | Comparison of EIA and ESA   | 10  |
|            | <b>Environmental Management</b>                  |   |     |
|            | 9  | Rapid EIA – Strategic Environmental Assessment – Social Impact Assessment – Life Cycle Assessment |     |
| <b>IV</b>  | 10   | Environmental appraisal; Environmental management and Environmental auditing                      | 8   |
|            | 11   | Environmental Planning, Introduction to ISO and ISO14000  |     |
|            | <b>Integration of ESA in Disaster Management</b> |   |     |
|            | 12   | Environment management and Disaster management plans- Cost-benefit analysis, Public Participation |     |
| <b>V</b>   | 13   | EIA report: Content and nontechnical summary  | 9   |
|            | 14   | EIA Regulations in India – status of EIA in India – Current issues in EIA                         |     |
|            | <b>Legal and Regulatory Framework</b>            |   |     |
| <b>V</b>   | 15   | Environmental monitoring: Community Involvement   | 9   |
|            | 16   | Legal and Regulatory Framework  |     |
|            | 17   | Human and Ecological Risk Assessment  |     |

## PRACTICAL

(30 Hours)

**Exercise:** Preparation of digital map of disaster-prone areas and report writing

### References

- UNEP(2002), Environmental Impact Assessment Training Resource Annual
- Betty Bowers Marriot (1997), Environmental Impact Assessment: A Practical Guide, McGraw Hill
- Center L W (1997), Environmental Impact Assessment, McGraw Hill
- Lee N and George C (2000) Environmental Impact Assessment in Developing and Transition Countries, John & Willey Sons Ltd.
- Gupta A K, Niar S S and Chatterjee S (2013), Disaster Management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi
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- [https://unece.org/DAM/env/eia/documents/SEA\\_CBNA/Georgia\\_manual\\_en.pdf](https://unece.org/DAM/env/eia/documents/SEA_CBNA/Georgia_manual_en.pdf)
- [https://capacity4dev.europa.eu/groups/public-environment-climate/info/strategic-environmental-assessment\\_en](https://capacity4dev.europa.eu/groups/public-environment-climate/info/strategic-environmental-assessment_en)
- <https://www.niehs.nih.gov/about/stewardship/faq>
- <https://www.mha.gov.in/sites/default/files/2022-08/NPDM-101209%5B1%5D.pdf>
- [https://ebooks.inflibnet.ac.in/geop15/chapter/legal-framework-issues-of-disaster-management/#:~:text=National%20Disaster%20Response%20Fund%20\(Section,exclusively%20for%20mitigation%20of%20disaster.](https://ebooks.inflibnet.ac.in/geop15/chapter/legal-framework-issues-of-disaster-management/#:~:text=National%20Disaster%20Response%20Fund%20(Section,exclusively%20for%20mitigation%20of%20disaster.)

### Course Outcomes

| No.   | Upon completion of the course, the graduate will be able to            | Cognitive Level | PSO addressed |
|-------|--|-----------------|---------------|
| CO-1  | Understand the basic concepts of Environmental Impact Assessment       | U               | PSO - 1       |
| CO-2  | Analyse the current issues in EIA                                      | An              | PSO – 3       |
| CO- 3 | Create digital map of disaster prone areas                             | C               | PSO – 4       |
| CO- 4 | Evaluate the importance of EIA   | E               | PSO - 3       |
| CO -5 | Analyse the Legal and Regulatory Framework of environmental management | An              | PSO – 3,4     |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: DISASTER PREPAREDNESS AND PREVENTION**

**Credits: 4:0:0 (Lecture:Tutorial: Practical)**

| CO No. | CO   | PO/PSO    | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|--|-----------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understand the basic concepts of Environmental Impact Assessment       | PSO - 1   | U               | F, C               | L                        | -             |
| 2      | Analyse the current issues in EIA                                      | PSO – 3   | An              | M                  | L                        | -             |
| 3      | Create digital map of disaster prone areas                             | PSO – 4   | C               | M                  | L                        | P             |
| 4      | Evaluate the importance of EIA   | PSO - 3   | E               | C, M               | L                        | -             |
| 5      | Analyse the Legal and Regulatory Framework of environmental management | PSO – 3,4 | An              | F, M               | L                        | -             |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|      | PSO1 | PSO 2 | PSO 3 | PSO 4 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 |
|------|------|-------|-------|-------|------|------|------|------|------|------|------|------|
| CO 1 | 3    | 1     | -     | -     | 3    | -    | -    | 3    | -    | -    | -    | -    |
| CO 2 | -    | -     | 3     | 2     | 3    | -    | -    | 1    | -    | 3    | -    | -    |
| CO 3 | -    | -     | 2     | 3     | -    | -    | -    | 2    | 3    | -    | -    | -    |
| CO 4 | -    | -     | 3     | 2     | 3    | -    | -    | 1    | -    | 3    | -    | -    |
| CO 5 | -    | 1     | 2     | 3     | -    | -    | -    | -    | 2    | 3    | -    | -    |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            | ✓          | ✓                         |
| CO 2 | ✓             | ✓          |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             |            |            | ✓                         |
| CO 5 | ✓             |            | ✓          |                           |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK7DSEGGY403</b>  |                  |                   |                    |                  |
| Course Title   | <b>SUSTAINABLE CITY PLANNING</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | VII  |                  |                   |                    |                  |
| Academic Level | 400-499  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | The course creates an awareness of best practices in urban planning related to urban sustainability and appropriate spatial measures for sustainable city plan |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit  | Content   | Hrs |
|------------|---|---|-----|
| <b>I</b>   | <b>Introduction to Sustainable Built Environment</b>    |   | 9   |
|            | 1   | Fundamentals of sustainable development-Sustainability and sustainable development- The Three E's of Sustainable Development: Environment, Economics, Ethics, and Ecology                                     |     |
|            | 2   | Sustainable Urbanization of natural and built environment   |     |
|            | 3   | Sustainable City Planning: Checklist and Priorities, Social, Cultural and Economic Aspects of Urban Sustainability.   |     |
| <b>II</b>  | <b>Urban Planning</b>                                   |   | 9   |
|            | 4   | Concept and Need of Urban Planning  |     |
|            | 5   | Urban planning approaches- Utopianism- Perspective view of the urban area of Fourier's Phalanstère-Marxist Approach- Neighbourhood Concept, Contributions of Ebenezer Howard, Clarence Perry, Clarence Stein. |     |
|            | 6   | Components of urban planning  |     |
| <b>III</b> | <b>Sustainable smart cities</b>                         |   | 9   |
|            | 8   | Principles of green and smart cities-Climate change indicators and their meaning for cities   |     |
|            | 9   | Mobility and transportation within urban areas  |     |
| <b>IV</b>  | <b>Urban Development and Sustainable Infrastructure</b> |   | 9   |
|            | 11  | Slums-factors influencing development-effects.  |     |
|            | 12  | Urban Development Plan  |     |
|            | 13  | Community Participation in Developing Sustainable Design  |     |
|            | 14  | City services: utilities (water, energy, and communications), public street lighting, roadways and traffic, public transport,   |     |

|          |   |   |   |
|----------|---|---|---|
|          |   | signage, environmental quality, cleaning of public spaces, waste and sewage management, maintenance                           |   |
|          | 15  | The impact of ICT on the social fabric, the management of cities, and their innovation potential                              |   |
| <b>V</b> | <b>Urban Sustainability Appraisal in Cities</b> |   | 9 |
|          | 16  | Appropriate Sustainability Indicators for Urban India   |   |
|          | 17  | Urban Planning Policy Interventions to enhance urban sustainability   |   |
|          | 18  | Study of existing cities in India-Mumbai, New Delhi, Kolkata, Chennai, Kochi-Finding the problems-Designing for smart cities. |   |

## PRACTICALS

(30 hours)

**Exercise 1:** Lorenz Curve

**Exercise 2:** Transport Network Analysis-Calculation of various index-Alpha, Gamma, Beta, Detour, Associated Numbers.

**Exercise 3:** Urban sprawl and Urban Land Use identification using GIS.

## References

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- Moore, S. A. Alternative Routes to the Sustainable City: Austin, Curitiba, and Frankfurt. Lanham, MD: Lexington Books, 2007.
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- P. T. Kivell and I. McKay, Public Ownership of Urban Land, Transactions of the Institute of British Geographers, Vol. 13, No. 2 (1988), pp. 165-178
- Patrick McAuslan, Land Policy: A Framework for Analysis and Action, Journal of African Law, Vol. 31, No. 1/2, Essays in Honour of A. N. Allott (Spring, 1987), pp. 185-206
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- Robert K. Brown, The Dilemma of Urban Planning, Land Economics, Vol. 37, No. 3 (Aug. 1961), pp. 260-263
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### Web References

- <https://smartcities.gov.in/node/115>
- [https://www.wbhidcoltd.com/upload\\_file/report\\_publication/report11.pdf](https://www.wbhidcoltd.com/upload_file/report_publication/report11.pdf)
- <https://www.cmdachennai.gov.in/masterplan.html>
- <https://mmrda.maharashtra.gov.in/divisions/town-planning/overview>
- <https://www.udri.org/portfolio-items/planning-for-mumbai/>
- <http://119.226.139.196/ddaweb/planning.aspx>

### Course Outcomes

| No   | Upon completion of Sustainable city planning the graduate will be able to                           | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | To develop knowledge, understanding, and critical thinking related to sustainable urban development | R, U            | PSO 1         |
| CO-2 | To understand the concept and need of urban planning  | R, U            | PSO 1         |
| CO-3 | To apply the green city and green infrastructure concept  | Ap              | PSO 2         |
| CO-4 | To create an insight into urban development plans and sustainable infrastructure                    | C               | PSO 3         |
| CO-5 | To analyze the urban sustainability in various cities of India                                      | An              | PSO 4         |

**R- Remember, U- Understand, Ap- Apply, An- Analyse, E- Evaluate, C- Create**

**Name of the Course: SUSTAINABLE CITY PLANNING**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/ PSO | Cognitive Level | Knowledge Category | Lecture (L)/ Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|---------------------------|---------------|
| 1      | To develop knowledge, understanding, and critical thinking related to sustainable urban development | PSO 1   | R, U            | F, C               | L                         | -             |
| 2      | To understand the concept and need of urban planning  | PSO 1   | R, U            | F, C               | L                         | -             |
| 3      | To apply the green city and green infrastructure concept  | PSO 2   | Ap              | M                  | L                         | -             |
| 4      | To create an insight into urban development plans and sustainable infrastructure                    | PSO 3   | C               | P                  | L                         | -             |



|   |  |       |    |   |   |   |
|---|--|-------|----|---|---|---|
| 5 | To analyze the urban sustainability in various cities in India | PSO 4 | An | P | L | - |
|---|--|-------|----|---|---|---|

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs :**

|      | PSO 1 | PSO2 | PSO 3 | PSO4 | PO 1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|------|-------|------|-------|------|------|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | 3     | -    | -     | -    | 3    | -   | -   | -   | -   | -   | -   | -   |
| CO 2 | 3     | -    | -     | -    | 3    | -   | -   | -   | -   | -   | -   | -   |
| CO 3 | -     | 3    | -     | -    | -    | -   | 3   | -   | -   | -   | -   | -   |
| CO 4 | -     | -    | 2     | -    | -    | -   | 3   | -   | -   | -   | -   | -   |
| CO 5 | -     | -    | -     | 2    | -    | -   | -   | -   | -   | 2   | -   | -   |

**Assessment Rubrics:**

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics :**

|      | Internal Exam | Assignment | Project Evaluation | End Semester Examinations |
|------|---------------|------------|--------------------|---------------------------|
| CO 1 | ✓             | ✓          |                    | ✓                         |
| CO 2 | ✓             |            |                    | ✓                         |
| CO 3 | ✓             |            | ✓                  | ✓                         |
| CO 4 | ✓             |            |                    | ✓                         |
| CO 5 |               | ✓          |                    | ✓                         |



**University of Kerala**

|                |  |                  |                   |                    |                  |
|----------------|--|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>GEOGRAPHY</b>   |                  |                   |                    |                  |
| Course Code    | <b>UK7DSEGGY404</b>  |                  |                   |                    |                  |
| Course Title   | <b>HYDROLOGY</b>   |                  |                   |                    |                  |
| Type of Course | <b>DSE</b>   |                  |                   |                    |                  |
| Semester       | VII  |                  |                   |                    |                  |
| Academic Level | 400 - 499  |                  |                   |                    |                  |
| Course Details | Credit   | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4  | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |  |                  |                   |                    |                  |
| Course Summary | The course deals with hydrological cycle, surface and underground water distribution and quality |                  |                   |                    |                  |

**Detailed Syllabus:**

| Module     | Unit                             | Content  | Hrs |
|------------|----------------------------------|--|-----|
| <b>I</b>   | <b>Introduction</b>              |  | 9   |
|            | 1                                | Hydrology – Scope – Branches of Hydrology – Properties of water – Hydrological Cycle – Human Impacts on Hydrological cycle – Global Water Balance – Water Budget |     |
|            | 2                                | Evaporation: Evaporation as a process – Open Water Evaporation – Soil Evaporation – Transpiration and Total Evaporation – Measurement of Evaporation             |     |
|            | 3                                | Precipitation: Types, Form, Distribution of Precipitation – Measurement of Rainfall: Spatial and Temporal methods  |     |
| <b>II</b>  | <b>Surface Water Systems</b>     |  | 9   |
|            | 4                                | Hyetograph, Runoff- Topographic control on runoff generation- mechanisms of run off  |     |
|            | 5                                | Formation of surface water resources; streams, rivers, lakes, swamps, seas and oceans  |     |
|            | 6                                | Drainage basin-definition- characteristics   |     |
| <b>III</b> | <b>Underground Water Systems</b> |  | 9   |
|            | 7                                | Subsurface flow- Concept of Infiltration, Factors affecting Infiltration   |     |
|            | 8                                | Porosity and Permeability – Zone of aeration and Saturation –Types and Properties of Aquifers – Recharge, Storage, Discharge                                     |     |
|            | 9                                | Principles of Groundwater flow   |     |
| <b>IV</b>  | <b>Water Quality</b>             |  | 9   |
|            | 10                               | Water Quality: Meaning and Concept – Water Pollution –Types and Impacts  |     |
|            | 11                               | Water Quality Parameters: Physical and Chemical -Temperature, Turbidity, TDS, TSS, E.coli, EC, pH, DO, BOD, Trace constituents and Heavy Metal Concentration     |     |
|            | 12                               | Water Quality Measurement: Gravimetric and Volumetric methods – Colorimetry – Proxy measures of Water Quality  |     |

| V | Water Resource Management |  | 9 |
|---|---------------------------|--|---|
|   | 13                        | Water Resources Assessment - Hydrology and Water Resource Management |   |
|   | 14                        | Water Resource Management : Approaches and Strategies                |   |
|   | 15                        | Integrated Water Resource Management : Principles and Practices      |   |

### PRACTICAL

(30 Hours)

**Exercise 1:** Calculation of Water Balance

**Exercise 2:** Determination of Climatic Types using Thornthwaite's Method

**Exercise 3:** Determination of Climatic Types using Koeppen's Method

**Exercise 4:** Interpolation of rainfall by Arithmetic method

**Exercise 5:** Estimation of average precipitation using Thiessen Polygon method

### Course Outcomes

| No.  | Upon completion of the course the graduate will be able to    | Cognitive Level | PSO addressed |
|------|---|-----------------|---------------|
| CO-1 | Understands the concept of Hydrologic cycle and Water Balance | U, C            | PSO-1,3       |
| CO-2 | Identifies the characteristic features of Drainage basin      | R, U            | PSO-1         |
| CO-3 | Understands the processes involved in Underground water flow  | U               | PSO-1,2       |
| CO-4 | Evaluates the parameters of water quality                     | E               | PSO-2,4       |
| CO-5 | Analyses the need for water resource management               | An              | PSO-2,4       |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

**Name of the Course: HYDROLOGY**

**Credits: 4:0:0 (Lecture: Tutorial: Practical)**

| CO No. | CO  | PO/PSO  | Cognitive Level | Knowledge Category | Lecture (L)/Tutorial (T) | Practical (P) |
|--------|---|---------|-----------------|--------------------|--------------------------|---------------|
| 1      | Understands the concept of Hydrologic cycle and Water Balance | PSO-1,3 | U, C            | F, P               | L                        | P             |
| 2      | Identifies the characteristic                                 | PSO-1   | R, U            | F                  | L                        |               |

|   |  |         |    |   |   |  |
|---|--|---------|----|---|---|--|
|   | features of Drainage basin                                   |         |    |   |   |  |
| 3 | Understands the processes involved in Underground water flow | PSO-1,2 | U  | C | L |  |
| 4 | Evaluates the parameters of water quality                    | PSO-2,4 | E  | M | L |  |
| 5 | Analyses the need for water resource management              | PSO-2,4 | An | M | L |  |

**F-Factual, C- Conceptual, P-Procedural, M-Metacognitive**

**Mapping of COs with PSOs and POs:**

|             | PS O1 | PSO 2 | PSO 3 | PSO4 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
|-------------|-------|-------|-------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>CO 1</b> | 3     | -     | 3     | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| <b>CO 2</b> | -     | 3     | -     | -    | 3   | -   | -   | -   | -   | -   | -   | -   |
| <b>CO 3</b> | 3     | 2     | -     | -    | 3   | 3   | -   | -   | -   | -   | -   | -   |
| <b>CO 4</b> | -     | 3     | -     | -    | -   | 3   | 1   | -   | -   | -   | -   | 2   |
| <b>CO 5</b> | -     | 3     | -     | 3    | -   | 3   | -   | -   | -   | -   | -   | 3   |

**Assessment Rubrics:**

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

**Mapping of COs to Assessment Rubrics:**

|      | Internal Exam | Assignment | Discussion | End Semester Examinations |
|------|---------------|------------|------------|---------------------------|
| CO 1 | ✓             |            | ✓          | ✓                         |
| CO 2 | ✓             |            |            | ✓                         |
| CO 3 | ✓             |            |            | ✓                         |
| CO 4 | ✓             | ✓          |            | ✓                         |
| CO 5 | ✓             | ✓          |            |                           |