



**ROYAL SCHOOL OF ENVIRONMENTAL AND EARTH
SCIENCES
(RSEES)**

DEPARTMENT OF GEOGRAPHY

M.A/M.Sc. in Geography

Postgraduate Programme as per NEP, 2020

W.E.F

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1. Preamble

The LOCF is designed to emphasize the teaching-learning process at the postgraduate M.A/M.Sc. level in Geography to sensitize and train the students to develop a sound and systematic approach regarding the mechanism and processes of natural and human activities. The focus is to help the students to understand the latest tools and techniques, which would help in giving a focused and precise understanding of a geographical phenomenon. The purpose is to enhance the capability of the students in perceiving, creating and analyzing sound geographical bases and concepts.

This Learning Outcome based Curriculum Framework is designed to emphasize the teaching and learning process at the undergraduate M.A/M.Sc. from teacher centric to student centric by strengthening the quality of teaching and learning in the present day real life scenario at the global, regional and local levels. It has considered learning as an activity of creativity, innovations and analyzing geographical phenomena. The committee prepared the major learning outcomes, which would help the students to understand and critically analyze various dimensions of the geographical issues.

The following objectives would be achieved:

1. To orient the students towards the identification and analysis of various facets of geographical features and processes.
2. To develop students' aptitude for acquiring basic skills for carrying out fieldwork.
3. To facilitate the students to learn skills of map making.
4. To guide students to learn the science and art of collecting, processing and interpreting the data.
5. To expose the students to the use of the updated technologies of remote sensing, IRNSS, GNSS, Geographical Information System (GIS) and GIScience.

1.4 Introduction

Learning Outcomes based Curriculum Framework (LOCF) for Geography under CBCS Geography has been broadly accepted as a bridge discipline between human and physical sciences. In the beginning, geography focussed on the physical aspects of the earth but modern geography is an all-encompassing discipline that seeks to understand the earth and all of its human and natural processes as integrating elements. Geography has emerged through time as a transdisciplinary subject integrating regional diversity with the concepts of the timing of space and the spacing of time. It provides broad, human and place-centred perspectives on the transformation of rural ecology to a globalized urban landscape at different levels, from the local/regional/national to global. Geography is transformed through:

- i. Journey from Village Ecology to Urban Regional Studies
- ii. Qualitative Techniques to Spatial Information Technology
- iii. Global to Micro-level Community Perception Approach

It is essential to focus on the current socio-spatial problems, issues and challenges to make the students aware of the application of geography to sort out the societal upcoming problems. It is also essential to rejuvenate ancestral geographical knowledge to address the current local and global problems. In the light of exponential changes in the field of arts, science and technology, it is to be studied from multifaceted angles. It is important for the policymakers to consider the geospatial aspects with references to the location and in the context of the best utilization of public utilities. It is further expected that if the above said spatial aspects are considered, it will certainly develop the lagging regions and people living therein

1.4 Approach to Curriculum Planning

Learning Outcomes based Curriculum Framework (LOCF) for geography curriculum revision incorporates dynamic processes including fundamental and modern techniques, contemporary paradigms such as global initiatives like Sustainable Development Goals (SDGs), Disaster Risk Reduction (DRR), Paris Climate Action and national initiatives like smart cities, Securities of food, water, energy, human health and livelihood, biodiversity, and disaster management. The approaches are to make geography more scientific and societal-need oriented which could be the panacea to India's developmental challenges. Geography uses scientific knowledge with the current focus that includes spatio-temporal analysis, skill development, GIScience, sustainable development and human security.

1.2.1 Nature and Extent of Masters Degree Programme in Geography

A Masters degree in Geography is a 2 year degree course which is divided into 4 semesters as under.

| Sl. No. | Year | Mandatory Credits to be secured for the Award |
|---------|--|---|
| 1 | After successful completion of 1st Year | 40 |
| 2 | After successful completion of 1st and 2nd Years | 40 |

The curriculum inculcates knowledge of essential concepts of physical and human geography together with appropriate techniques using lectures, tutorials, group discussions, presentations, assignment evaluation, lab work and field visits. Thus, the pedagogy process includes:

- Identifying and explaining the physical and cultural characteristics globally and processes in varied spatiotemporal contexts.
- Understanding human-environment and nature-society interactions as well as various global environmental challenges.
- Analysing geographic information by using geospatial technologies.
- Responding to the global and national challenges and initiatives.

1.2.2 Aims of Masters Degree Programme in Geography:

The overall objectives of the Learning Outcomes-bases Framework (LOCF) for MA/MSc degree in Geography are-

- Appreciate the relevance of geographical knowledge to everyday life.
- Demonstrate the ability to communicate geographic information by utilising both lecture and practical exercises.
- Inculcate the ability to evaluate and solve geographical problems effectively.
- Demonstrate the skills in using geographical research tools including spatial statistics, cartography, remote sensing, GIS, IRNSS and GIScience.
- Based on the field knowledge and advanced technologies, the students should be able to understand the ongoing geographical problems in different regions and levels with appropriate pragmatic solutions.
- Understand the relevance of geographical knowledge to everyday life.
- Getting the ability to communicate geographic information utilizing both lecture and practical exercises.
- Inculcate the ability to evaluate geographical problems effectively.
- Exhibit the skill in using geographical research tools including spatial statistics, cartography, remote sensing, GIS, IRNSS and GIScience.

1.3 Post Graduate Attributes in Geography

Some of the characteristic attributes of a postgraduate in Geography include:

- G A 1. Disciplinary Knowledge:** Students gain in-depth knowledge of basic and applied areas of geography. Core and discipline courses train them in fundamental branches of the subject. Technical and skill courses help them to learn tools and techniques. Geography student gets a unique opportunity to experiment and observe on the field.
- G A 2. Problem Solving:** The understanding about surroundings, the issues that concern life, climate or to that matter water crisis etc makes students yearn to look for solutions. Geography discipline has the flair which connects to everyday living and survival thus generates problem solving aptitude.
- G A 3. Analytical Reasoning:** The geography course teaches variety of tools, techniques and data handling which develop analytical reasoning to solve the issues. In fact, the training in all these courses is meant to develop the analytical reasoning, mining the data from satellite images, aerial photographs, and observations to arrive at interpretations and inferences.
- G A 4. Research Related Skills:** The course content trains students to learn basic research design, data collection process, and ethics to conduct research work through field work. The specially developed course on research methodology and field work acquaints them to prepare questionnaires, selecting sample plans, identifying right kind of objectives, data collection methods, field exposure, mental mapping, reproducing the observations, analysis and finally to prepare reports.
- G A 5. Critical Thinking:** Geography subject creates scientific logic aptitude and approaches a problem through critical reasoning. The course content is enabled to stimulate the questioning capacity for what, where, who, when and how. The papers like Environmental Geography, Disaster Management, Global Economic System, Resource Management to name a few.
- G A 6. Cooperation/ Teamwork:** The course enables to develop skill to work with students of diverse backgrounds and cooperation on same topic will increase better understanding. The group assignments and presentations are essential elements in the course design that will inculcate the team spirits. The field excursions help develop great bonding, working and executing the plans on ground. They also learn to work as team in case any emergency with group member away from institution/home/or city.
- G A 7. Scientific Reasoning:** Course will develop critical analysis of theories and models, raising critical questions about the theories and models, developing hypothesis and learning their testing. Many of the courses in geography are truly scientific in nature which will generate scientific reasoning aptitude and also skills to look towards new approaches.
- G A 8. Self-Directed Learning:** A graduate in the discipline of geography has to engage continuously in a learning process that can give a sense of direction to him/her. Different types of project work and field-oriented papers encourage the pupil to take up self-directed task so as to widen their research horizon and ultimately look beyond the basic course book. Anyone with a mindset to move beyond the curriculum has to go for self-learning as the teaching content is fixed and defined. Under the supervision of the teacher one can easily involve themselves in fruitful learning. This will enable

the students to take up task that is well understood and adapting themselves to the changing curriculum needs.

G A 9. Multicultural Competence: Geography is a discipline which is not limited to any specific place or space. Its identity is based on multi-plural, multi-cultural and multi sited ethnography. As a subject it emphasizes on regional and cultural studies which involves detailed understanding of places and perceptions. Also, as a disciplinarian, it allows the learner to learn about both their own culture as well as those of their distant counterparts. This diversified knowledge also helps them to respect all fellows following varied community norms, traditions, and practices. Field studies have been much helpful in introducing multicultural competencies to students of geography.

G A 10. Leadership Readiness/ Quality: A good leader needs to have the knowledge, rational thinking and ready to act at the time of need. Geography encourages to have descriptive and explanatory knowledge of one's surroundings and the globe as a whole, it develops rational thinking and prepares the students to think about alternative social, economic and environmental futures. So, a geography student will be a good leader and will contribute to different capacities.

G A 11. Communication Skills: Students develops effective communication skills through oral presentations, and group discussions on the subject content. Besides interviewing people, field surveys and public dealing with different cadre of people makes him/her confident in communication. The compiling, processing, and analyzing the information from the field; and presenting in the form of reports enhances written communication skills.

G A 12. Lifelong learning: Lifelong learning is a seamless process of learning from primary education to higher levels and even during one's profession through formal or informal modes. The core of Geography is the man-environment interaction, which remains relevant for all at all stages of human life. So, the basic knowledge and the tools Geographer learns help them in their future life and the process of learning will continue throughout life.

1.4 Qualification Descriptors for M.A./M.Sc. Programme

The qualification descriptors for the M.A./M.Sc. Programme in Geography shall have the learning attributes such as field knowledge, use of advanced tools and techniques for better comprehension of space and society etc. It also involves awareness among the students regarding the issues of different regions and socio-cultural aspects. The main qualification descriptors for the geography M.A./M.Sc. Programme includes:

- i. Demonstration of exhaustive understanding of the basic concepts of Geography and an awareness of the emerging areas of the field.
- ii. Acquisition of in-depth understanding of the applied aspects of Geography as well as interdisciplinary subjects in everyday life.
- iii. Improvement of critical thinking and skills facilitating.
- iv. The application of knowledge gained in the field of Geography in the classroom to the practical solving of societal problems.
- v. Development of intellectual capabilities to get into further research in the discipline.
- vi. Acquirement of practical laboratory skills, systematic research design and collection of experimental data.
- vii. Exhibition of ability to quantitatively analyse the experimental data and writing project reports.
- viii. Development of strong oral and written communication skills promoting the ability to present ideas and also teamwork spirits.

1.5 The Programme Learning Outcomes relating to M.A./M.Sc. degree programme in Geography

The learning outcome is to prepare the students of MA/MSc degree in Geography, to understand the development of the subject and delve around issues suited to the needs of the contemporary world. It covers a wide range of papers covering various themes and maintains uniformity of structure across universities in the country. Geography being interdisciplinary in nature integrates learning derived from all basic and applied sciences/social sciences.

- PO-1: **Knowledge of Geography:** Students of the BA/BSc Honours degree in Geography will learn to use geographic understanding of various sub fields such as physiography, resources, global economic systems, socio- cultural aspects, rural and urban milieu, environmental and disaster studies, and mapping methods.
- PO-2: **Understanding of global issues:** They will also develop an understanding of global issues from economic, social, environmental, and political perspectives, which has relevance in further studies across the globe.
- PO-3: **Interpretation and generation of map:** They will be trained to read and interpret maps and generate maps and other geographic representations as well as extract, analyze, and present information from a spatial perspective.
- PO-4: **Analyse both geographical qualitative and quantitative data:** The learners will have a general understanding of the various theoretical and methodological approaches in both physical and human geography and be able to develop research questions and critically analyze both qualitative and quantitative data to answer those questions.
- PO-5: **Critical analysis with diverse perspective:** After the completion of the course, students will be able to evaluate, analyze, synthesize, and critique key concepts and experiences, and apply diverse perspectives to find creative solutions to problems concerning society and the natural world.
- PO-6: **Developing skills of team work:** They will also be able to learn how to take teamwork experiences in the classroom and field excursions and use them to their advantage to further their career.
- PO-7: **Skills of research and Hypothesis testing:** Students will acquire knowledge of scientific methods of data handling, hypothesis generation, testing and analysis.
- PO-8: **New and independent learning techniques:** Students will be able to assess and build upon previous learning and experiences to pursue new learning, independently and in collaboration with others.
- PO-9: **Preparing the students to face the real world challenges:** The course will better-equip students to face the challenges of an increasingly intercultural world, and contribute to improving tolerance within the diverse societies of India and World.
- PO-10: **Developing ethical aptitudes:** Students will develop the ethical aptitudes and dispositions necessary to acquire and hold leadership positions in industry, government, and professional organizations.
- PO-11: **Developing interest on exploration and personality development:** They will also develop zeal of exploration and investigation, travel exploration and effective communication skills and teamwork.
- PO-12: **Life-long learning:** The geography graduates will be able to pursue wide range of knowledge and experience from various fields. They will be well informed citizens who can play immense role in the civil society too and also be able to pursue career as planners, administrators, academicians, and managers.

Programme Specific Outcomes

- PSO-1: Correlate the knowledge of physical geography with the human geography.
- PSO-2: Develop a sustainable approach towards the ecosystem and the biosphere.
- PSO-3: Explain the cultural geographic processes and how variations in culture affect our perception and management of regions.
- PSO-4: Identify socio-economic problems of their community through field experience.

1.6 Teaching Learning Process

Teaching and learning in this programme involve classroom lectures, tutorials, and remedial classes.

For every core course in each semester, one tutorial class is provided per week as per the structure of the syllabus.

Remedial classes are organized for below mediocre class students who could not pass the particular course as well as those who would like to improve their performance in certain courses, during working days. Classes also could be organized during the long vacation like summer vacation or winter vacation for those students who are genuinely in need of such intensive coaching.

The teaching learning process allows **Direct Assessment** of students in the form of:

1. Written assignments and projects submitted by students the project-based learning
2. Group discussion
3. Home assignments
4. Quizzes and class tests
5. PPT presentations, Seminars, interactive sessions
6. Questionnaire/ Schedule survey
7. Space survey: GPS, Transect, Quadrat
8. Field visit

Indirect Assessment methods include:

1. Tutorial classes that allow closer interaction between the students and the teacher as each student gets individual attention.
2. Co-curricular activity
3. Mentor Mentee activity

1.6. Programme Evaluation

1. The Programme structures and examinations shall normally be based on Semester System. However, the Academic Council may approve Trimester/Annual System for specified programmes.
2. In addition to end term examinations, student shall be evaluated for his/her academic performance in a
3. Programme through, presentations, analysis, homework assignments, term papers, projects, field work, seminars, quizzes, class tests or any other mode as may be prescribed in the syllabi. The basic structure of each Programme shall be prescribed by the Board of Studies and approved by the Academic Council.
4. Each Programme shall have a number of credits assigned to it depending upon the academic load of the Programme which shall be assessed on the basis of weekly contact hours of

lecture, tutorial and laboratory classes, self-study. The credits for the project and the dissertation shall be based on the quantum of work expected.

5. Depending upon the nature of the programme, the components of internal assessment may vary. However, the following suggestive table indicates the distribution of marks for various components in a semester: -

| | <i>Components of Evaluation</i> | <i>Marks</i> | <i>Frequenc y</i> | <i>Code</i> | <i>Weightag e (%)</i> |
|----------|--|---|------------------------------|--------------------|--------------------------------------|
| A | Continuous Evaluation | | | | |
| i | Analysis/Class test | Combination of any three from (i) to (v) with 5 marks each | 1-3 | C | 45% |
| ii | Home Assignment | | 1-3 | H | |
| iii | Project | | 1 | P | |
| iv | Seminar | | 1-2 | S | |
| v | Viva- Voce/Presentation | | 1-2 | V | |
| vi | MSE | MSE shall be of 10 marks | 1-3 | Q/CT | |
| vii | Attendance | Attendance shall be of 5 marks | 100% | A | 5% |
| B | Semester End Examination | | 1 | SEE | 50% |
| | Total | | | | 100% |

STRUCTURE OF THE SYLLABUS FOR 2 YEAR PG PROGRAMME

SCHOOL NAME - Royal School of Environment and Earth Sciences (RSEES)
DEPARTMENT NAME - Department of Geography
PROGRAMME NAME - M.A./ M.Sc. Program

| 1st SEMESTER | | | | |
|---|--|--------------|---------------|--------------|
| COURSE CODE | COURSE TITLE | LEVEL | CREDIT | L-T-P |
| GE0164C101 | Advanced Geomorphology | 400 | 4 | 4-0-0 |
| GE0164C102 | Advanced Climatology | 400 | 4 | 4-0-0 |
| GE0164C103 | Statistical Techniques in Geography | 400 | 4 | 4-0-0 |
| GE0164C104 | Cartographic Techniques | 400 | 4 | 4-0-0 |
| GE0164C115 | Practical - I | 400 | 4 | 0-0-8 |
| | Swayam Course (Upcoming) | 400 | 3/4 | |
| TOTAL CREDIT FOR 1st SEMESTER | | | 20+3/4 | |
| 2nd SEMESTER | | | | |
| COURSE CODE | COURSE TITLE | LEVEL | CREDIT | L-T-P |
| GE0164C201 | Economic Geography | 400 | 4 | 4-0-0 |
| GE0164C202 | Evolution of Geographical thought | 400 | 4 | 4-0-0 |
| GE0164C203 | Geography of Rural Development | 400 | 4 | 4-0-0 |
| GE0164C204 | Urban Geography | 400 | 4 | 4-0-0 |
| GE0164C215 | Practical-II | 400 | 4 | 0-0-8 |
| | Swayam Course (Upcoming) | 400 | 3/4 | |
| TOTAL CREDIT FOR 2nd SEMESTER | | | 20+3/4 | |
| TOTAL CREDIT FOR YEAR 1= 46/48 | | | | |
| 3rd SEMESTER | | | | |
| COURSE CODE | COURSE TITLE | LEVEL | CREDIT | L-T-P |
| GE0164C301 | GIS, GPS: Principles and applications | 500 | 4 | 4-0-0 |
| GE0164C302 | Principles of Remote Sensing | 500 | 4 | 4-0-0 |
| GE0164C303 | Research Methodology in Geography | 500 | 4 | 4-0-0 |
| GE0164C304 | Disaster Management | 500 | 4 | 4-0-0 |
| GE0164C325 | Report writing on Environmental issues | 500 | 4 | 4-0-0 |
| TOTAL CREDIT FOR 3rd SEMESTER | | | 20 | |
| or 3rd Semester (For students with 3rd & 4th Semester Research) | | | | |
| GE0164C321 | Research Project Phase – 1 | | 20 | |
| Course Work with Research, (Course Work=12 Credit, Research=8 Credits) | | | | |
| COURSE CODE | COURSE TITLE | LEVEL | CREDIT | L-T-P |
| GE0164C301 | GIS, GPS: Principles and applications | 500 | 4 | 4-0-0 |
| GE0164C302 | Principles of Remote Sensing | 500 | 4 | 4-0-0 |
| GE0164C303 | Research Methodology in Geography | 500 | 4 | 4-0-0 |
| GE0164C324 | Research Project (Minor) | 500 | 8 | |
| | Total | | 20 | |

| 4th SEMESTER | | | | |
|---|--|--------------|---------------|--------------|
| COURSE CODE | COURSE TITLE | LEVEL | CREDIT | L-T-P |
| GEO164C401 | Geography of Population and Gender | 500 | 4 | 4-0-0 |
| GEO164C402 | Environment and Sustainable Development | 500 | 4 | 4-0-0 |
| GEO164C403 | Biodiversity Conservation | 500 | 4 | 4-0-0 |
| GEO164C404 | Geography of Tourism | 500 | 4 | 4-0-0 |
| GEO164C425 | Report Writing on Socio-Economic Issues | 500 | 4 | |
| Or 4th Semester (For students with 3rd & 4th Semester Research) | | | | |
| GEO162C421 | Research Project Phase – 2 Dissertation only (for students who have completed only coursework of 20 credits in 3 rd semester/for 'Coursework only' in lieu of research) | 500 | 20 | |
| Course Work with Research, (Course Work=8 Credit, Research=12 Credits) | | | | |
| GEO164C401 | Geography of Population and Gender | 500 | 4 | 4-0-0 |
| GEO164C404 | Environment and sustainable Development | 500 | 4 | 4-0-0 |
| GEO164C426 | Research (Major) | 500 | 12 | |
| Total Credit for 4 th Semester | | | 20 | |
| TOTAL CREDIT FOR YEAR 2 = 40 | | | | |

M.A./M. Sc. Course in Geography: Semester-I

| | | | | |
|------------------------------------|-------------------------------|-----------------|---------------------------|---|
| Paper I Core Course | ADVANCED GEOMORPHOLOGY | | | Subject Code: GE0164C 101 |
| | L-T-P-C: 4-0-0-4 | Credit Units: 4 | Scheme of Evaluation: (T) | |

Course Objectives: *The pivotal point of this course is to make students familiar with the fundamental concepts of geomorphology which incorporates the topics related to geomorphic structure and processes, earth's interior and composition, evolution of landforms and so on.*

Course Outcomes:

| By the end of this course the students will be able to: | | |
|---|---|-----------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| C01. | Recall the principles, basic concepts of Geomorphology and its recent trends. | BT 1 |
| C02. | Outline the roles of structure, process, and time in shaping the landforms along with interpreting geomorphological maps. | BT 2 |
| C03. | Apply the knowledge in geographical research. | BT 3 |
| C04. | Distinguish between the mechanisms that control these processes and also analyse how the natural and anthropogenic operating factors affect the development of landforms. | BT 4 |
| C05. | Evaluate the functioning of Earth systems in real time. | BT 5 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|--|-----------|
| Unit 1 | Advanced Concepts in Process Geomorphology: System dynamics and feedback mechanisms, Rate laws and equilibrium concepts; Weathering Processes and Rates: Chemical and Physical weathering processes; Multicyclic & Polygenetic Evolution of Landscape, Concept of threshold. | 12 |
| Unit 2 | Plate Tectonic: Concepts of related views; Earth movements: Epeirogenesis, orogenesis, isostasy; Forces of crustal instability: Earthquake and Volcanicity; Evolution of Landforms: Fluvial Landforms, Drainage Pattern Evolution; Karst Landforms: Erosional and Depositional Features. | 12 |
| Unit 3 | Glacial and Periglacial dynamics and erosion processes, Glacial landform development; Coastal Landform evolution: Processes and Features; Aeolian processes and landforms, Drainage systems in arid regions; Climate change impacts. | 12 |
| Unit 4 | Remote Sensing in Geomorphology; Geomorphological Hazards: Landslide, Flood analysis and prediction, Coastal erosion, Risk assessment; Human impacts on landscapes; Restoration approaches and techniques, Case Studies. | 12 |
| | Total | 48 |

Text Books:

1. Hart, M. G. (1986): Geomorphology Pure and Applied, George Allen & Unwin, London
2. Dayal, P. (2nd edition), (1996): A Textbook of Geomorphology, Shukla Book Depot, Patna
3. Savindra Singh (Rep. 2011): Geomorphology, Prayag Pustak Bhawan, Allahabad.
4. Strahler A. H and Strahler, A. N. (1992): Modern Physical Geography, John Wiley, New York.
5. Thornbury, W. D. (Rep.2011): Principles of Geomorphology, John Wiley and Sons, New York.

Reference Books:

1. Ahmad, E., 1985: Geomorphology, Kalyani Publishers, New Delhi
2. Derbishire, E. (ed), 1976: Geomorphology and Climate, Wiley, London.
3. Fairbridge, R.W. (ed), 1968: Encyclopedia of Geomorphology, Reinhold, New York
4. Gregory, K. J. and Walling, D.E., 1973: Drainage Basin- Form and Process, Edward Arnold, London
5. Goudie, Andrew, et. Al. (eds), 1981: Geomorphological Techniques, George Allen & Unwin, London.
6. Kale, V. S. and Gupta, A. (Rep.2011): Introduction to Geomorphology, Orient Longman, Calcutta.
7. Ollier, C. D. (1981): Tectonics and Landforms, Longman, London.
8. Spark B.W. (1972): Geomorphology, Longman, New York.
9. Young, A. (1972): Slope, Longman, New York, Oliver and Boyd, Edinburgh

| | | | | |
|-------------------------------------|-----------------------------|------------------------|----------------------------------|----------------------|
| Paper II Core Course | ADVANCED CLIMATOLOGY | | | Subject Code: |
| | L-T-P-C: 4-0-0-4 | Credit Units: 4 | Scheme of Evaluation: (T) | GE0164C102 |

Course Objectives: *The course aims to illustrate the atmospheric elements, processes and resultant weather and climates, the impact of climates on planet earth and its associated processes.*

Course Outcomes:

| By the end of this course the students will be able to: | | |
|--|---|------------------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| C01. | Define the elements of weather and climate and its impacts at different scales. | BT 1 |
| C02. | Demonstrate and interpret weather maps. | BT 2 |
| C03. | Develop the climatic aspects and its bearing on planet earth. | BT 3 |
| C04. | Distinguish world climatic regimes. | BT 4 |
| C05. | Assess the monsoon and its vagaries, global climate change and its consequences. | BT 5 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|----------------|---|----------------|
| Unit 1 | The field of Climatology and its subdivisions, Factors affecting weather and climate, Composition and vertical structure of the atmosphere- physical properties, chemical composition and temperature changes; Insolation, factors affecting insolation, latitudinal and seasonal variation of insolation and the heat budget. | 10 |
| Unit 2 | Horizontal and Vertical distribution of temperature, Inversion of temperature, Pressure measurement and units, Factors affecting air pressure, Pressure changes with altitude, Observed distribution of surface pressure, Wind observation and measurement, Factors affecting wind, Geostrophic wind, Gradient wind, Pressure systems and air circulation, Models of general circulation, Local winds and Jet stream | 14 |
| Unit 3 | Air mass and fronts: types, characteristics and their influence on weather and climate, Factors affecting evaporation, atmospheric lapse rate (Normal, environmental, dry and wet adiabatic) and stability (absolute stability, absolute instability, conditional instability); Changes of state of water, factors affecting condensation; Classification of world climate of Koppen and Thornthwaite | 10 |
| Unit 4 | Monsoon climate: origin, mechanism of development and distribution. Climatic disturbances: cyclone, anticyclone, drought, cloud burst, el-nino; Techniques of weather forecasting, Causes of global warming and climate change - natural and anthropogenic (industrial and vehicular emissions of Green House Gases, Radiation patterns); Global precipitation and temperature distribution patterns; Extreme climatic events and processes; Urban heat island formation, concept of micro-climate in urban context El Nino and La Nina effects; Consequences of climate change in various geographical regions, concept of urban green space | 14 |
| | Total | 48 |

Text Books:

1. Barry, R. G. and Chorley, R. J. (1971): Atmosphere, Weather and Climate, Methuen Co. Ltd, London.
2. Critchfield, H. J. (Rep.2010): General Climatology, Prentice Hall, New Delhi.
3. Lal, D. S. (2003): Climatology, Sharda Pustak Bhawan, 11 , University Road, Allahabad-211002
4. Rob Vandenburg (2009): Evaluating Climate Change and Development.
5. Singh, S. (Rep.2011): Climatology, Prayag Pustak Bhawan, Allahabad

Reference Books:

1. Lutgens F. K., Tarbuck E. J. and Tasa D., (2009): The Atmosphere: An Introduction to Meteorology, Prentice-Hall, Englewood Cliffs, New Jersey
2. Oliver J. E. and Hidore J. J., (2002): Climatology: An Atmospheric Science, Pearson Education, New Delhi.
3. Stringer, E. N., 1982: Hoirn, L. A., (1980): An Introduction to Climate, International Series.
4. Trewartha, G. T. and Horn, L. A., (1980): An Introduction to Climate, International Series.
5. Weiesner, C. J.: Hydrometeorology, Chapman & Hall Ltd.

| | | | | |
|--------------------------------------|--|------------------------|----------------------------------|--------------------------|
| Paper III Core Course | STATISTICAL TECHNIQUES IN GEOGRAPHY | | | Subject Code: |
| | L-T-P-C: 4-0-0-4 | Credit Units: 4 | Scheme of Evaluation: (T) | GEO164C1 03 |

Course Objectives: *This paper provides an understanding of the pure and applied nature of Geography along with the key elements in the discipline.*

Course Outcomes:

| After successful completion of the course, the students will be able to: | | |
|--|--|-----------------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| CO1. | Define the statistical methods and quantitative techniques used in Geography. | BT 1 |
| CO2. | Interpret various methods and techniques of data collection, data tabulation, data interpretation and analysis. | BT 2 |
| CO3. | Identify the importance of data in geography. | BT 3 |
| CO4. | Analyse data through tabulation, sample size and other methods by handling data in the field. | BT 4 |
| CO5. | Interpretation of data and validation of hypothesis | BT 5 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|--|-----------|
| Unit 1 | Quantitative and qualitative techniques; Significance and limitations of quantitative techniques; Descriptive and inferential statistics; Levels of measurement; Data sources and acquisition techniques; Sample and sampling techniques; Geographic data matrix. | 12 |
| Unit 2 | Measures of central tendencies (Mean, Median and Mode); Measures of dispersion (Range, Quartile Deviation, Mean Deviation, Standard Deviation; Coefficient of variation); Concept of spatial mean and median centres and standard distance and its uses, Nearest Neighbour Analysis (NNA), Inferential statistics – Chi-square (χ^2) Analysis, Concept of ANOVA and F-test; | 12 |
| Unit 3 | Correlation and regression analysis (simple and multiple), Regression residual mapping, Parametric tests - t -test; Nonlinear relationships - Exponential and power function types; Theoretical distributions: Normal, Poisson and Binomial. | 12 |
| Unit 4 | Basics of matrix algebra: Matrices - definition, types; minors and co-factors, determinant of a square matrix, inverse, adjoint, solutions of linear equations; Linear algebra in developing multivariate regression models; | 12 |
| | Total | 48 |

Note: Computer / calculator based compulsory home assignments may be given for various units. Scientific calculator may be permitted in the examination hall for this paper.

Text Books:

1. Gregory, S., 1978: Statistical Methods and the Geographer, Longman, London.
2. Hammond R and P. S. McCullagh, 1974: Quantitative Techniques in Geography: An Introduction, Clarendon Press, Oxford.
3. Johnston R. J., 1973: Multivariate Statistical Analysis in Geography, Longman, London.
4. King, L. J., 1969: Statistical Methods in Geographical Studies, London.
5. Mahmood, A., 1977: Statistical Methods in Geographical Studies, Concept Publications, Delhi.
6. Maurice Yeats, 1974: An Introduction to Quantitative Analysis in Human Geography, McGraw, Hill, New York.
7. Paul, S. K., 1998: Statistics for Geoscientists, Tata McGraw Hill, New Delhi.

8. Robinson, G. M., 1998: Methods and Techniques in Human Geography, John Wiley & Sons, Chichester.
9. Sarkar, A. 2013: Quantitative Geography: Techniques and Presentations. Orient BlackSwan Private Ltd., New Delhi

Reference Books:

1. David Unwin, 1981: Introductory Spatial Analysis, Methuen, London.
2. John P.Cole and Cuchlaine A. M. King, 1968: Quantitative Geography, John Wiley, London.
3. Koutsoyiannis, 1973: Theory of Econometrics, Mcmillan, London.
4. Peter Haggett, Andrew D. Cliff, & Allan Frey, 1977: Location Methods Vol. I and II, Edward Arnold, London.
5. Taylor P.J., 1983: Quantitative Methods in Geography: An Introduction to Spatial Analysis, Waveland Press, Boston Publishers.

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|-------------------------------------|--------------------------------|------------------------|----------------------------------|----------------------|
| Paper IV Core Course | CARTOGRAPHIC TECHNIQUES | | | Subject Code: |
| | L-T-P-C: 4-0-0-4 | Credit Units: 4 | Scheme of Evaluation: (T) | GEO164C104 |

Course Objectives: *This course focuses to make the students understand the science and art of map-making along with clearing the basics of map and map scale and its varied types along with the diagrammatic representation of geographical data.*

Course Outcomes:

| By the end of this course the students will be able to: | | |
|--|---|------------------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| CO1. | Define about map and its types, map scale and profile mapping. | BT 1 |
| CO2. | Interpret different projection systems and digital mapping analysis. | BT 2 |
| CO3. | Construct graphs/charts, cartograms and thematic maps based on socio-economic, cultural and climatic data. | BT 3 |
| CO4. | Conclude the importance of maps for regional development and decision-making. | BT 5 |
| CO5. | Evaluate different aspects of surveying and levelling using varied techniques and equipment. | BT 5 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|----------------|---|----------------|
| Unit 1 | Cartography: The science and art of map making; Nature and scope of Cartography; Earth as a cartographic problem, Scales, Coordinate systems, distance and directions in maps; Developable and developed surfaces - types and properties; Map projection systems and types; Importance of cartography in geography; Digital cartography- data sources for digital mapping and analysis. | 10 |
| Unit 2 | Map Projection: Basic concepts, classification, basic Principles of construction of zenithal, conical and cylindrical groups of map projections and choice of map projections. | 14 |
| Unit 3 | Principles of mapping and base map preparation; Concept of generalization; Map design and layout; Thematic map and its classes; Choropleth and isopleth maps; Map reading and analysis; Representation of socio-economic and climatic data | 12 |
| Unit 4 | Basic idea of geodetic and plane surveying; Principles and techniques of surveying by: Plane Table, Prismatic Compass, Transit Theodolite, Levelling by Dumpy Level / Auto level, Total Station (Introductory idea) | 12 |
| | Total | 48 |

Text Books:

1. Misra, R. P., et al., 2014: Fundamentals of Cartography, Concept Publishing co. New Delhi
2. Monkhouse, F. J., and Wilkinson, H. R., 1989: Maps and Diagrams, B. I., Publications Pvt. Ltd., New Delhi-59
3. Robinson, A. H., et al., 1995: Elements of Cartography, 6th Edition, John Wiley & Sons, New York.
4. Steers, J. A., 1965: An Introduction to the Study of Map Projection, University of London, London.
5. Talukder, S., 2008: Introduction to Map Projections, EBH Publishers (India), Guwahati.

Reference Books:

1. Cuff, D. J. and Mattson, M. T., 1982: Thematic Maps: Their Design and Production, Methuen, New Work
2. Singh, R. L.: Elements of Practical Geography, Kalyani Publishers, New Delhi.
3. Sing, R. L. and Singh Rana, P. B., 1998: Elements of Practical Geography, Kalyani Publishers, New Delhi.
4. Saha, P. K. and Basu, P., 2010: Advanced Geography Practical – A Laboratory Manual, Books and Allied (P) Ltd., Kolkata.

| | | | | |
|------------------------------------|-------------------------|------------------------|----------------------------------|----------------------|
| Paper V Core Course | PRACTICAL - I | | | Subject Code: |
| | L-T-P-C: 0-0-8-4 | Credit Units: 4 | Scheme of Evaluation: (P) | GEO164C115 |

Course Objectives: *The course aims at increasing the practical knowledge of the students.*

Course Outcomes:

| By the end of this course the students will be able to: | | |
|---|---|-----------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| CO1. | Define the principles and concepts involved in Practical Geography. | BT 1 |
| CO2. | Classify the nature, characteristics, and sources of geospatial data. | BT 2 |
| CO3. | Develop the skills and technical capabilities of the students. | BT 3 |
| CO4. | Simplify the application of the concepts related to Geomorphology, Climatology and Population Geography. | BT 4 |
| CO5. | Inspect geospatial tools and technologies to create and analyse geospatial data for natural resource assessments, planning and management related applications. | BT 4 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|---|-----------|
| Unit 1 | Analysis of Slope by Wentworth's method - 1 Exercise , Profile drawing (Serial, Superimposed, Composite, Projected) - 2 Exercises , Drainage basin delimitation, Ordering of streams, calculation of bifurcation ratio, length ratio, drainage frequency and density, computation of basin circularity ratio- 1 exercise | 4 |
| Unit 2 | Verification of law of drainage morphometry - 3 Exercises , drawing of Hypsometric curve and computation of Integral - 1 Exercise | 4 |
| Unit 3 | Preparation of rainfall variability map (Assam and Rajasthan) - 2 Exercises , drawing of hythergraph, climograph and ergograph - 3 Exercises , rainfall frequency analysis, rainfall dispersion graph, water deficiency and surplus graph- 2 Exercises , weather chart interpretation- 1 Exercise | 8 |
| Unit 4 | Mapping of Population distribution, density and concentration in the World and India, Population growth trend and projection in the World and India, Population-Resource regions in the world- 9 Exercises | 8 |
| | Total | 24 |

Reference Books:

1. Weiesner, C. J.: **Hydrometeorology**, Chapman & Hall Ltd.
2. Gregory, K, J. and Walling, D.E., 1973: Drainage Basin- Form and Process, Edward Arnold, London
3. Goudie, Andrew, et. Al. (eds), 1981: Geomorphological Techniques, George Allen & Unwin, London.
4. Woods, R., 1979: **Population Analysis in Geography**, Longman, London.

M.A./M. Sc. Course in Geography: Semester-II

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|------------------------------------|---|----------------------|
| Paper I Core Course | ECONOMIC GEOGRAPHY | Subject Code: |
| | L-T-P-C: 4-0-0-4 Credit Units: 4 Scheme of Evaluation: (T) | GEO164C201 |

Course Objectives: *It focuses on the basic concepts of economic geography and its associated patterns and processes of the prime economic activities of the world.*

Course Outcomes:

| By the end of this course the students will be able to: | | |
|---|---|-----------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| CO1. | Define concepts and ways on how geographical aspects organise economic space. | BT 1 |
| CO2. | Compare different sectors of economy and arrive at logical conclusion regarding importance of each sector in economic development of the nation. | BT 2 |
| CO3. | Identify the principles and significance of economic geography. | BT 3 |
| CO4. | Discover new insights among students on the relevance of economy and geography and associated problems in contemporary times. | BT 4 |
| CO5. | Appraise the regional variation in the economic scenario and distribution pattern of resources. | BT 5 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|--|-----------|
| Unit 1 | Nature and scope of Economic Geography, its evolution and theoretical development; Approaches in Economic Geography, Types of economic activities and factors of location influencing the activities | 10 |
| Unit 2 | Economic Geography of Agriculture, Place of agriculture in global economy, Agricultural System and Regions of the World and India, Types of agriculture, Concept of crop combination and its methods of delineation (Weaver, Doi and Rafiullah), diversification and rotation, Von Thunen Model of Land Use Planning. | 14 |
| Unit 3 | Classification of Industries, Factors of Industrial location, , Theories of Industrial Location- A. Weber, E.M. Hoover, A. Losch, A. Pred and D. M. Smith, Industrial Regions: World and India, Industrial Development experience in India and Japan, World Distribution of ICT (Information and Communication Technology) . | 10 |
| Unit 4 | Economic Geography of Resources; its global pattern of distribution and production: water, coal, petroleum, forest and nuclear, International trade of Food grains and cash crops, Special Economic Zones, Theories of development: Myrdal and Rostow, Level of economic development on global perspective. | 14 |
| | Total | 48 |

Text Books:

- Alexander J. W., 1963: Economic Geography, Prentice-Hall Inc., Englewood Cliffs, New
- Coe, N. M., Kelly, P. F., & Yeung, H. W. (2019). *Economic geography: a contemporary introduction*. John Wiley & Sons.
- Combes P., Mayer T. and Thisse J. F., 2008: Economic Geography: The Integration of Introduction, Wiley-Blackwell.
- Hodder B. W. and Lee Roger, 1974: Economic Geography, Taylor and Francis.

Reference Books:

1. Gunnar Alexanderson, 1988: ***Geography of Manufacturing***, Prentice-Hall Inc, (E.E. Edition)
2. Isard, W., 1956: ***Location and Space Economy***, MIT Press, Cambridge.
3. Losch, A., 1954: ***The Economics of Location***, New Haven.
4. Smith, David M., 1981: ***Industrial Location: An Economic Geographical Analysis***, Wiley, New York
5. Symons, L., 1979: ***Agricultural Geography***, West view Press, Colorado
6. Thomas, R. S. and Corbin, P. B., 1974: ***The Geography of Economic Activity***, McGraw Hill, New York

| | | | | |
|-------------------------------------|--|------------------------|----------------------------------|----------------------|
| Paper II Core Course | EVOLUTION OF GEOGRAPHICAL THOUGHT | | | Subject Code: |
| | L-T-P-C: 4-0-0-4 | Credit Units: 4 | Scheme of Evaluation: (T) | GEO164C202 |

Learning objective: The objective of this course is to make the student look into the chronology of development of the subject of geography through contribution of varied scholars, approaches and schools, major themes and components of geography.

Learning Outcomes:

| After successful completion of the course the students will be able to: | | |
|---|---|-----------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| CO 1. | Define the various parameters and components of Geography. | BT 1 |
| CO 2. | Interpret the chronological development of the subject of geography. | BT 2 |
| CO 3. | Identify the contributions made by the schools of geography. | BT 3 |
| CO 4. | Discover the physical and humanistic perspective and its dimensions in Geography in relation to the physical and cultural surrounding | BT 4 |
| CO 5. | Explain the various issues of real world with a geographical perspective | BT 5 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|---|-----------|
| Unit 1 | Place of geography in the classification of knowledge: Defining the field of geography, relation of geography with other natural and social sciences; Geography as the study of areal differentiation and spatial organisation; Defining the field of human geography, reactions to nomothetic and ideographic approaches | 12 |
| Unit 2 | Geography through the ages; general character of geographic knowledge during the ancient and mediaeval period; impact of discoveries and European renaissance on the emergence of modern geography, Foundations of modern geography: Contribution of German (Humboldt, Ritter, Ratzel), French (Paul Vidal de la Blache), British and American geographers. | 12 |
| Unit 3 | Evolution of geographic thought (Determinism- the impact of Darwinism, Possibilism, Human Ecology, Morphology of Landscape), , Areal differentiation) and their impact in the development of the field, Post Structuralism and Post Colonialism | 10 |
| Unit 4 | Positivism and quantitative revolution, behaviouralism, radicalism, humanism and post-modernism, locational analysis, Explanation in geography: laws and theories; models and system analysis, Spatial analysis: history and concept of space and spatial organisation, gender geography and post modernism geography | 14 |
| | Total | 48 |

Text Books:

1. Adhikari, S., 1992: Geographical Thought, Chaitanya Pub. House, Allahabad.
2. Berry, B. J. L., 1973: 'A Paradigm for Modern Geography', in R. J. Chorley (ed), Directions in Geography, London Methuen.
3. Bunge, W., 1962: Theoretical Geography, Lund Studies in Geography, Lund, C.W.K. Gleerup.
4. Buttimar, A., 1978: 'On People, Paradigms and Progress in Geography', in D.R. Stoddart (ed),
5. Geography, Ideology and Social Concern, Oxford, Blackwell.
6. Dickinson, R. E., 1969: Makers of Modern Geography, Routledge and Kegan Paul, London.

Reference Books:

1. Dikshit, R. D., 1997: Geographical Thoughts: A Contextual History of Ideas, Prentice Hall of India, New Delhi.

2. Gold, J. R., 1980: An Introduction to Behavioural Geography, Oxford University Press.
3. Hartshorne, R., 1939: The Nature of Geography, Association of American Geographers, Lancaster, Penn.
4. Hartshorne, R., 1959: Perspective on the Nature of Geography, Rand Mckully, Chicago.
5. Harvey, D., 1969: Explanation in Geography, St. Martin's Press, New York.
6. Harvey, Milton and Holly, Brian P.1989: Themes in Geographic Thought, Routledge, London.
7. James, P. E., 1972: ***All Possible World: A History of Geographic Ideas***, The Odyssey Press, New York.

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|--------------------------------------|---------------------------------------|------------------------|----------------------------------|----------------------|
| Paper III Core Course | GEOGRAPHY OF RURAL DEVELOPMENT | | | Subject Code: |
| | L-T-P-C: 4-0-0-4 | Credit Units: 4 | Scheme of Evaluation: (T) | GE0164C203 |

Course Objectives: *The course aims to make students aware of the concepts, approaches and planning process related to rural development in India, along with understanding the rural economic base, rural development process and provision of services in rural areas.*

Course Outcomes:

| After successful completion of the course, the students will be able to: | | |
|--|--|-----------------------|
| CO. No. | Course Outcome | Blooms Taxonomy Level |
| CO1 | Define the need and approaches to rural development. | BT1 |
| CO2 | Interpret in detail about the rural economic base especially about the significance of development of non-farm sector in rural areas. | BT2 |
| CO3 | Develop in-depth knowledge of pre and post-independence period of rural development. | BT3 |
| CO4 | Analyze the relevance of access to services like health, education in rural areas | BT4 |
| CO5 | Interpret the various types of data along with critical evaluation . | BT5 |
| CO6 | Design and develop a detail project report | BT6 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|--|-----------|
| Unit 1 | Rural Development: meaning and dimensions; Need for Rural Development studies in geography; Rural Poverty; Rural development in India: Role of Zilla Parishad and Panchayats in Rural Development, Rural Finances – Banks, NABARD etc. | 10 |
| Unit 2 | Concept of Village, Rural Settlement pattern, Rural Economic Base: Panchayati raj System, Agriculture and Allied Sectors, Seasonality and Need for Expanding Non-Farm Activities, Co-operatives | 14 |
| Unit 3 | The Problem of Housing, housing types, low cost houses, the housing schemes in rural area, Dimensions of Rural unemployment and under employment; Rural – Urban migration issues. | 10 |
| Unit 4 | Sustainable Rural Development programmes in India: Drought Prone Area Programmes, Hill Area Development Programme, PMGSY, DDU-GKY, MGNREGA, Jan Dhan Yojana, DAY-NRLM, NHM, Samagra Sikhsa Abhiyan | 14 |
| | Total | 48 |

Text Book:

1. Gilg A. W., 1985: An Introduction to Rural Geography, Edwin Arnold, London.
2. Krishnamurthy, J. 2000: Rural Development - Problems and Prospects, Rawat Publs., Jaipur
3. Lee D. A. and Chaudhri D. P. (eds.), 1983: Rural Development and State, Methuen, London.
4. Misra R. P. and Sundaram, K. V. (eds.), 1979: Rural Area Development: Perspectives and Approaches, Sterling, New Delhi.

References:

1. Robb P. (ed.), 1983: Rural South Asia: Linkages, Change and Development, Curzon Press.
2. UNAPDI 1986: Local Level Planning and Rural Development: Alternative Strategies. (United Nations Asian & Pacific Development Institute, Bangkok), Concept Publs. Co., New Delhi.
3. Wanmali S., 1992: Rural Infrastructure Settlement Systems and Development of the Regional Economy in South India, International Food Policy Research Institute, Washington, D.C.
4. Yugandhar, B. N. and Mukherjee, Neela (eds.) 1991: Studies in Village India: Issues in Rural Development, Concept Publs. Co., New Delhi.

Misra, R. P. (ed.), 1985: Rural Development: Capitalist and Socialist Paths, Vol. 1, Concept, New Delhi

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|-------------------------------------|-------------------------|------------------------|----------------------------------|--------------------------|
| Paper IV Core Course | Urban Geography | | | Subject Code: |
| | L-T-P-C: 4-0-0-4 | Credit Units: 4 | Scheme of Evaluation: (T) | GE0164D204 |

Course Objectives: *The course aims to give the idea of the concept of urban geography and its major aspects as well as it seeks to develop new insights among the students on the relevance of urban geography and its associated problems in a rapidly urbanizing world.*

Course outcomes:

| After successful completion of the course, the students will be able to: | | |
|---|--|--------------------------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| CO1. | Define concepts related to urban geography and its approaches. | BT 1 |
| CO2. | Explain different geographical factors which organise urban spaces and develop ideas in its relation. | BT 2 |
| CO3. | Identify the new insights on the relevance of urban geography. | BT 3 |
| CO4. | Discover and develop skills seeking advanced studies on urban planning and development. | BT 4 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|----------------|--|----------------|
| Unit 1 | Urban Geography: Meaning, subject matter and scope; approaches and trends in urban geography. Towns: Types, characteristics, origin and growth in global and national contexts, Functional classification of towns; Schemes of city classification | 10 |
| Unit 2 | Patterns of Urbanization in developed and developing countries; Components of urbanization and urban population growth, Urban morphology and land use structure; Theories on the internal structure of town: the Sector Theory of Homer and Hoyt, and the Multiple Nuclei Theory of Harris and Ullman | 14 |
| Unit 3 | Concept of city-region, urban agglomeration, urban sprawl, Umland and periphery, rural-urban dichotomy and continuum, urban fringe, satellite town, new town, smart city. Urban Systems: Concept of urban system and hierarchy; Christaller's Central Place Theory; the rank-size distribution of cities; concept of primate city. | 14 |
| Unit 4 | Urban issues and problems: Housing, slums, civic amenities (transportation and drinking water), traffic congestion, pollution (air, noise, water), and crime. Urbanization and urban development planning in India: Trend and regional patterns of urbanization; national urban development policies and programmes; emerging urban issues of selected cities (Delhi NCR, Mumbai, Guwahati). | 10 |
| | Total | 48 |

Text Book:

1. Bansal, S.C. (2010): Urban Geography, Meenakshi Prakashan, Meerut.
2. Hall T., 2006: Urban Geography, Taylor and Francis.
3. Kaplan D. H., Wheeler J. O. and Holloway S. R., 2008: Urban Geography, John Wiley.

4. Knox P. L. and McCarthy L., 2005: Urbanization: An Introduction to Urban Geography, Pearson Prentice Hall New York.
5. Pacione M., 2009: Urban Geography: A Global Perspective, Taylor and Francis.

References:

1. Bala, R. (1986): Urbanisation in India, Rawat, Jaipur.
2. Fyfe N. R. and Kenny J. T., 2005: The Urban Geography Reader, Routledge.
3. Graham S. and Marvin S., 2001: Splintering Urbanism: Networked
4. Infrastructures, Technological Mobilities and the Urban Condition, Routledge
5. Knox P. L. and Pinch S., 2006: Urban Social Geography: An Introduction, Prentice Hall
6. Kundu, A. (1992): Urban Development and Urban Research in India, Khanna Publication, New Delhi.
7. Ramachandran R (1989): Urbanisation and Urban Systems of India, Oxford University Press, New Delhi

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|------------------------------------|--|--|
| Paper V Core Course | Practical II L-T-P-C: 0-0-8-4 Credit Units: 4 Scheme of Evaluation: (P) | Subject Code: GEO164C2 15 |
|------------------------------------|--|--|

Course Objectives: *It aims to give the idea of the importance of various surveying techniques in geographical study, the concepts regarding scale, map projections to suit map purposes and understand the field ethics and different tools of field study.*

Course Outcomes:

| By the end of this course the students will be able to: | | |
|--|--|------------------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| C01. | Recall varied cartographic terms, terminologies and techniques. | BT 1 |
| C02. | Construct different types of projections. | BT 2 |
| C03. | Develop the skills in preparation of thematic maps at various levels. | BT 3 |
| C04. | Analyze GIS based maps and perform spatial analysis, classify remote sensing satellite-based data and prepare large scale maps by using traditional surveying equipment and GPS survey. | BT 4 |
| C05. | Assess the multiple surveying techniques and its application. | BT 5 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|----------------|---|----------------|
| Unit 1 | Population projection model and graph of India /North East India/ Any State of India - 1 Exercise ; Cartogram for socio-economic or any other data of India or North East India - Urban population by proportionate sphere or circles - 1 Exercise ; Preparation of one quantitative thematic map (Choropleth technique or Isopleth technique) by using district level data of any state of India - 1 Exercise | 12 |
| Unit 2 | Map Projection: Basic concepts, classification, basic Principles of construction of zenithal, conical and cylindrical groups of map projections and choice of map projections. Construction of graticules and drawing of maps thereon including properties and uses of: Zenithal Gnomonic Projection (Equatorial case) Mollweide's Projection Conical Projection with two-standard parallels Lambert's Conical Equal Area Projection Mercator's Projection Preparation of topographic maps / profile/ contouring by using: Plane Table / Prismatic Compass Surveying – (1 Exercise) Profile / Contouring by Dumpy Level / Autolevel- (1 Exercise) | 12 |
| Unit 3 | Georeferencing of maps by using Open Source GIS / Professional GIS Software (1 Exercise) , Map in UTM Projection System (1 Exercise) , Map digitization and creation of point, line and polygon layers (3 Exercises) , Preparation of thematic maps (2 Exercises) ; | 12 |
| Unit 4 | Digital Image Processing- Unsupervised Classification and Supervised Classification (2 Exercises) ; Geographic Analysis of Spatial data: Spatial Mean Centre and Standard Distance (1 Exercise) ; Preparation of maps by using GPS data (1 Exercise) , Digital Elevation Modelling creation through different techniques (2 exercise) | 12 |
| | Total | 48 |

Text Books:

As per the list of GEO164C203 and GEO164C204

Reference Books:

As per the list of GEO164C203 and GEO164C204

SCHEME OF EVALUATION (GEO164C215)

- Internal Assessment and Mid-term Examinations: As per the University rules
- End Semester Examination should consist of the questions taking any one exercise from each module. The module-III and IV should have optional questions.
- The distribution of marks for each module will remain equal as far as practicable (Each question with 10% -20% variation in the distribution of marks may be set based on difficulty level and time requirements to perform the exercise). 80% of the total marks is reserved for 4 exercises to be performed with total duration of 4 (four) hours
- 10% of total marks is reserved for External Examiner
- 10% of total marks is reserved for Practical Records and Note Book
- Maintenance of Practical Records and Note Book is mandatory
- External Examiner is mandatory during End Semester Examination

SEMESTER III

| | | | | |
|------------------------------------|---|------------------------|----------------------------------|----------------------|
| Paper I Core Course | GIS AND GPS: PRINCIPLES AND APPLICATIONS | | | Subject Code: |
| | L-T-P-C: 4-0-0-4 | Credit Units: 4 | Scheme of Evaluation: (T) | GEO164C301 |

Course Objectives: *The course aims to make the students interpret the data, tools and technology and applications of Geoinformatics - GIS, Remote Sensing and GPS and Construct and Analyse maps using Geospatial Technology (Geoinformatics)*

Course Outcomes:

| After successful completion of the course, the students will be able to: | | |
|--|--|-----------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| CO1. | Define the fundamental terms and terminologies of Geoinformatics. | BT 1 |
| CO2. | Outline the strength and application of Geospatial Technology. | BT 2 |
| CO3. | Build map of the resources, their location and availability. | BT 3 |
| CO4. | Analyse the different remote sensing data sets collected from various platforms. | BT 4 |
| CO5. | Interpret Geospatial data in GIS platforms and perform analysis from various sources of data such as Remote Sensing and GPS for geographical research | BT 5 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|---|-----------|
| Unit 1 | Geographical Information Sciences – a brief history; Definitions of GIS, Components of a GIS; Referencing systems: International Terrestrial Reference Frame (ITRF); Ellipsoids and datum, Coordinate Systems; GIS data types and structure, Types of GIS Software Systems; Database Management Systems; Relational Database Management System | 12 |
| Unit 2 | Digital Elevation Model (DEM) and its derivatives; Analysis and uses of DEM; DEM data sources and data characteristics: SRTM, CartoSat DEM, ASTER, GLOBE, GTOPO, ALOS PRISM; 3-D visualization parameters of DEM; Methods for spatial interpolation for creating continuous 2-D surfaces from point / line data, their advantages and disadvantages; Triangulated Irregular Network (TIN) data structure and its characteristics. | 12 |
| Unit 3 | GIS data collection, Creating and maintaining geographic databases; Geographic query and analysis: Map queries and map algebra, Map overlays- arithmetic and weighted overlays; Geoprocessing - Buffering and Proximity analysis | 10 |
| Unit 4 | Basic concepts of GPS, Working principles of GPS, GPS errors and their corrections, GPS Receivers and their characteristics, Differential Positioning, Accuracy in GPS and DGPS, GPS surveying methods; Topographic mapping and GIS applications for GPS / DGPS. | 14 |
| | Total | 48 |

Text Books:

- Burrough, P. A., 1986: Principles of Geographical Information Systems in Land Resources Assessment, Clarendon Press, Oxford
- Burrough, P. A. and McDonnell, R. A., 1998: Principles of Geographical Information Systems, Oxford University Press, Oxford.
- Curtis, H., 2000: The GPS Accuracy Improvement Initiative, GPS World, June, 2000.
- Chrisman, N., 1997: Exploring Geographic Information Systems, John Wiley & Sons Inc.,
- De Mars, M. N., 1999: Fundamentals of Geographic Information Systems, John Wiley & Sons Inc., New York.
- Gopi, S., 2005: Global Positioning System Principles and Applications, Tata McGraw Hill, New Delhi.
- Kraaak, M. and Ormelling, F., 2004: Cartography Visualization of Geospatial Data, Pearson Education, Delhi.

Reference Books:

1. Chetry, N., (Editor) 2019: A Glimpse of Geospatial Technologies and Applications, EBH Publishers (India), Guwahati
2. Star, J. and Ester, J., 1990: Geographic Information System, Prentice-Hall.
3. Maguire, D. J., Goodchild, M. and Rhind, D. J., 1990: Geographical Information Systems: Principles and Applications, Longman Science and Technology Publications.
4. Robinson, A. H., et al., 1995: Elements of Cartography, John Wiley.

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|-------------------------------------|-------------------------------------|------------------------|----------------------------------|----------------------|
| Paper II Core Course | PRINCIPLES OF REMOTE SENSING | | | Subject Code: |
| | L-T-P-C: 4-0-0-4 | Credit Units: 4 | Scheme of Evaluation: (T) | GEO164C302 |

Course Objectives: *This course intends to show the rationale behind the use of remotely sensed data and its advantages and disadvantages and illustrate how GIS/GPS methodologies can be used to address spatial analysis from the theoretical and practical perspective.*

Course Outcomes:

| After successful completion of the course, the students will be able to: | | |
|--|--|-----------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| CO1. | Define basic concepts of remote sensing. | BT 1 |
| CO2. | Explain principles and applications of various remote sensing techniques including aerial photography. | BT 2 |
| CO3. | Utilize remote sensing data products for minor and major projects on environmental/natural resource assessments and mapping, disaster and hazard management, urban planning, and many applications. | BT 3 |
| CO4. | Apply this knowledge for land use land cover map preparation. | BT 3 |
| CO5. | Interpret Geospatial data | BT 5 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|--|-----------|
| Unit 1 | Needs and applications of Aerial photography; Aerial photography platforms; Planning aerial photography survey missions; Aerial camera and film characteristics; Types of aerial photographs, Vertical air photographs – its geometry, scale and height measurements, stereoscopic measurements of aerial photographs; Image / photo interpretation keys / elements; | 12 |
| Unit 2 | Earth observation satellites (EOS) and Remote Sensing (RS) satellites - orbital characteristics; Payloads of RS satellites; Types and characteristics of sensors; Spatial, radiometric, spectral and temporal resolutions of RS data; Path –Row referencing system; Data products, characteristics and uses of selected Remote Sensing Satellites– LANDSAT, IRS, SPOT, Quickbird, GeoEye and Sentinel data | 12 |
| Unit 3 | Electromagnetic radiation (EMR) principles, Spectral signatures / responses of earth materials – water, vegetation, urban landscape, soils and minerals; Major areas applications of remote sensing: Natural resource monitoring and management; Disaster management; Biomass estimation, Crop yield and acreage estimation. | 12 |
| Unit 4 | Introduction to Digital Image Processing (DIP) tools and techniques: Data preparation processes and techniques; Image classification techniques (Supervised and Unsupervised); Major classifiers / classification functions; Change detection analysis and accuracy assessment methods. Basic ideas and applications of thermal, hyperspectral, microwave and LiDAR Remote Sensing. | 12 |
| | Total | 48 |

Text Books:

1. Agarwal, C. S., and Garg, P. K., 2000: Textbook on Remote Sensing in Natural Resources Monitoring and Management, Wheeler Publishing, New Delhi.
2. Anji Reddy, M., 2008: Textbook of Remote Sensing and Geographic Information System, B.S. Publication, Hyderabad

Reference Books:

1. American Society of Photogrammetry, 1960: Manual of Photographic Interpretation, Banta Publishing Co., Menasha, Wisconsin.
2. Barret, E. C. and Curtis, L.E., 1976: Introduction to Environmental Remote Sensing, Chapman Hill, London.
3. Chetry, N. (Editor), 2019: A Glimpse of Geospatial Technologies and Applications, EBH Publishers (India), Guwahati
4. Curran, Paul, J., 1985: Principles of Remote Sensing, Longman Group Ltd.
5. Sabins, Floyd F., 1987: Remote Sensing Principles and Interpretation, W.H. Freeman and Company, New York.
6. Anderson, J. R., et al., 1976: A Landuse / Landcover Classification System for Uses with Remote Sensing Data, USGS Professional Paper
7. Avery, T.E., 1963: Interpretation of Aerial Photography, Burgess Publishing Co., Minneapolis.
8. Gonzalez, R. C., Woods, R. E., 2000: Digital Image Processing, Fifth Indian Reprint, Addison Wesley Longman, Delhi
9. Jensen, J. R., 2011: Remote Sensing of the Environment – An Earth Resource Perspective, 3rd Impression, Pearson, New Delhi
10. Joseph, George, 2005: Fundamentals of Remote Sensing, United Press India, Hyderabad.
11. Lilesand, T.M. and Kiefer, R.W., 2007: Remote Sensing and Image Interpretation, 6th Edition, John Wiley.
12. Rampal, K. K., 1999: Handbook of Aerial Photography and Interpretation, Concept Publishing Company, New Delhi-59.
13. Wolf, P. R., Dewitt, B. A., 2000: Elements of Photogrammetry With Applications in GIS, McGraw Hill, New York.

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|--------------------------------------|--|------------------------|----------------------------------|----------------------|
| Paper III Core Course | RESEARCH METHODOLOGY IN GEOGRAPHY | | | Subject Code: |
| | L-T-P-C: 4-0-0-4 | Credit Units: 4 | Scheme of Evaluation: (T) | GEO164D302 |

Course Objectives: *The course aims to make the students understand the basics of qualitative and quantitative research, literature review, data collection, identification of research problem, formulate research objectives and research questions, formulation of hypothesis and testing, framing of questionnaires, techniques of collection of both qualitative and quantitative data and their analysis.*

Course Outcomes:

| After the completion of course, the students will have ability to: | | |
|--|--|-----------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| CO1. | Define the concepts and tools of research. | BT 1 |
| CO2. | Infer ideas that can be taken up for research work through literature review. | BT 2 |
| CO3. | Develop hypothesis and research questions. | BT 3 |
| CO4. | Identify appropriate data collection and sampling techniques. | BT 3 |
| CO5. | Interpret the various types of data along with critical evaluation . | BT 5 |
| CO6. | Design and develop a scientific research report | BT 6 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|---|-----------|
| Unit 1 | Research: Definition, types, significance and important features; Research methodology in geography; Defining a research problem; Statement of the problem; Objectives, and hypothesis/ research questions, Database and methodology, significance, review of research works and bibliography and references. | 12 |
| Unit 2 | Research design: Meaning, need and features of a good design, Inductive and deductive approaches in geographic research, Hypothesis, theories and models in Geography; concept of model building and hypothesis testing, Research ethics: Plagiarism-classification and prevention; Intellectual property rights; Research report: Structural components and presentation. | 12 |
| Unit 3 | Field Work in Geographical Studies – Role, Value, Data and Ethics of Field-Work; Defining the Field and Identifying the Case Study – Rural / Urban / Physical / Human / Environmental; Designing the Field Report – Aims and Objectives, Methodology, Analysis, Interpretation and Writing the Report | 12 |
| Unit 4 | Sources of geographic data (Conventional and Geospatial technology based), their representation, interpretation and analysis; Field Tools and Techniques – Merits, Demerits and Selection of the Appropriate Technique; Observation (Participant / Non Participant), Questionnaires (Open/ Closed / Structured / Non-Structured) Interview with Special Focus on Focused Group Discussions | 12 |
| | Total | 48 |

Note: Computer / calculator based compulsory home assignments may be given for various units. Scientific calculator may be permitted in the examination hall for this paper.

Text Books:

1. Harvey, D, 1969: Explanation in Geography, Scientific Publisher, Jodhpur.
2. Lenon, B., Cleves, P. 2015. Geography Fieldwork and Skills, Harper-Collins.
3. Montello , D.R, Sutton, P. 2012. An Introduction to Scientific Research Methods in Geography and Environmental Studies, 2nd ed, Sage.
4. Murthy , K.L.N. 2004. Research Methodology in Geography: A Text Book, Concept Publishing Co.

Reference Books:

1. Evans, M., (1988): "Participant Observation: The Researcher as Research Tool" in Qualitative Methods in Human Geography, eds. J. Eyles and D. Smith, Polity.
2. Special Issue on "Doing Fieldwork" The Geographical Review 91:1-2 (2001).
3. Stoddard, R. H., (1982): Field Techniques and Research Methods in Geography, Kendall/Hunt.
4. Wolcott, H., (1995): The Art of Fieldwork, Alta Mira Press, Walnut Creek, CA.
5. Northey, N., Draper, D., Knight, D.B. 2015. Making Sense in Geography and Environmental Sciences: A Student's Guide to Research and Writing, 6th ed, Oxford University Press.
6. Parsons, T., Knight, P.G. 2015. How To Do Your Dissertation in Geography and Related Disciplines, 3rd ed, Routledge.

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|-------------------------------------|----------------------------|------------------------|----------------------------------|----------------------|
| Paper IV Core Course | DISASTER MANAGEMENT | | | Subject Code: |
| | L-T-P-C: 4-0-0-4 | Credit Units: 4 | Scheme of Evaluation: (T) | GEO164C304 |

Course Objectives: *The objective of this course is to make the student understand about the hazards, disasters, its associated causes and impacts, its distribution and mitigation with special reference to India.*

Course Outcomes:

| After successful completion of the course, the students will be able to: | | |
|--|---|-----------------------|
| SI No. | Course Outcome | Blooms Taxonomy Level |
| CO1. | Define the concepts of hazard and disaster and its related terminologies. | BT 1 |
| CO2. | Demonstrate the distribution and mapping of disasters that is prevalent in India. | BT 2 |
| CO3. | Explain the mitigation process and response to disasters across Indian territory. | BT 2 |
| CO4. | Distinguish between causes and effect of varied disasters, as well as their implications in present day India. | BT 4 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|--|-----------|
| Unit 1 | Disasters: Definition and Concepts: Hazards, Disasters; Risk and Vulnerability; Classification | 12 |
| Unit 2 | Disasters in India: (a) Flood: Causes, Impact, Distribution and Mapping; Landslide: Causes, Impact, Distribution and Mapping; Drought: Causes, Impact, Distribution and Mapping | 12 |
| Unit 3 | Disasters in India: (b) Earthquake and Tsunami: Causes, Impact, Distribution and Mapping; Cyclone: Causes, Impact, Distribution and Mapping. Manmade disasters: Causes, Impact, Distribution and Mapping | 12 |
| Unit 4 | Response and Mitigation to Disasters: Mitigation and Preparedness, NDMA and NIDM; Indigenous Knowledge and Community-Based Disaster Management; Do's and Don'ts During and Post Disasters | 12 |
| | Total | 48 |

Text Book:

1. Singh, R. B. (ed.), (2006) Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi.
2. Sinha, A. (2001). Disaster Management: Lessons Drawn and Strategies for Future, New United Press, New Delhi.

References:

1. Government of India. (1997) Vulnerability Atlas of India. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India.
2. Kapur, A. (2010) Vulnerable India: A Geographical Study of Disasters, Sage Publication, New Delhi.
3. Modh, S. (2010) Managing Natural Disaster: Hydrological, Marine and Geological Disasters, Macmillan, Delhi.
4. Singh, R.B. (2005) Risk Assessment and Vulnerability Analysis, IGNOU, New Delhi.
5. Stoltman, J.P. et al. (2004) International Perspectives on Natural Disasters, Kluwer Academic Publications. Dordrecht.
6. Singh Jagbir (2007) "Disaster Management Future Challenges and Opportunities", 2007. Publisher- I.K. International Pvt. Ltd. S-25, Green Park Extension, Uphaar Cinema Market, New Delhi, India (www.ikbooks.com).

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|------------------------------------|--|---|
| Paper V Core Course | Report Writing on Environmental Issues Credit Units: 4 Scheme of Evaluation: (P) | Subject Code: GEO164C325 |
|------------------------------------|--|---|

Course Objectives: *This course intends to make the students understand the various dimensions of field work and its role in geographical studies, along with introducing to basic report writing and field tools.*

Course Outcomes:

| After successful completion of the course, the students will be able to: | | |
|--|--|-----------------------|
| Sl. No. | Course Outcome | Blooms Taxonomy Level |
| CO1 | Choose new geographical landscape as study area. | BT1 |
| CO2 | Infer in-depth knowledge of different field techniques. | BT2 |
| CO3 | Choose the field ethics and different tools of field study. | BT3 |
| CO4 | Analyze different field techniques in detail. | BT4 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|---|-----------|
| Unit 1 | Selection of a nearby urban, industrial, or agricultural area facing notable environmental degradation (e.g., pollution, soil erosion, water scarcity, waste mismanagement), Field reconnaissance survey: preparation of base maps using GPS, Google Earth, or topographic sheets, Mapping of physical and environmental features: land use/land cover patterns, pollution sources (air, water, soil, noise), waste disposal sites, vegetation status, etc, Observation and documentation of visible environmental problems: solid waste accumulation, sewage disposal, chemical runoff, loss of biodiversity, etc, Interaction with local stakeholders for preliminary insights into the problem, Maintenance of field diaries and photographic documentation. | 12 |
| Unit 2 | Framing the core environmental problem for research based on field observations, Compilation of academic and policy literature from journals, books, government reports, and case studies related to the identified problem, Critical review of existing studies and theoretical frameworks (e.g., environmental degradation, pollution control, sustainability, urban ecology), Identification of research gaps and formulation of specific research questions/hypotheses, Development of conceptual models or problem trees to understand causal relationships. | 12 |
| Unit 3 | Preparation of structured and semi-structured questionnaires for stakeholders (residents, farmers, local authorities), Surveys, interviews, transect walks, environmental sampling (air, water, soil, etc.), Recording of qualitative and quantitative data, Use of census reports, municipal records, pollution control board data, weather records, satellite images, etc., Data coding, entry, and basic statistical summarization using Excel or any GIS/statistical software | 12 |
| Unit 4 | Generation of report (within about 100 A4 size pages including 30-40 maps/diagrams/field photographs) on the basis of field works carried out under , Final project presentation by each student using PowerPoint during on the scheduled date of viva-voce examination of this paper. | 12 |
| | Total | 24 |

Text Books:

1. Creswell, J., (1994). **Research Design: Qualitative and Quantitative Approaches**. UK: Sage Publications.

2. Dikshit, R. D. (2003). *The Art and Science of Geography: Integrated Readings*.

Reference books:

1. Evans, M. (1988). Participant Observation: The Researcher as Research Tool. In Eylesand, J and D. Smith (eds). Qualitative Methods in Human Geography. Cambridge, UK: Polity.
 2. Mukherjee, N. (2002). Participatory Learning and Action: with 100 Field Methods. Delhi, India: Concept Pubs. Co.
 3. Stoddard, R. H. (1982). Field Techniques and Research Methods in Geography. USA: Kendall/Hunt.
- Wolcott, H. (1995). The Art of Fieldwork. CA, USA: Alta Mira Press.

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|-------------------------------------|----------------------------------|------------------------|--------------------------|
| Paper IV Core Course | Research Project (Minor) | | Subject Code: |
| | L-T-P-C: | Credit Units: 8 | GE0164C3 24 |
| | Scheme of Evaluation: (P) | | |

Learning Objectives: *This paper provides an understanding the basics of research project preparation.*

Learning Outcomes:

| After the completion of course, the students will have ability to: | | |
|--|--|-----------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| C06. | Relate real world issues for carrying out research on a specific field | BT 1 |
| C07. | Infer ideas of research through literature review. | BT 2 |
| C08. | Develop hypothesis and research questions. | BT 3 |
| C09. | Identify appropriate sampling techniques. | BT 3 |
| C010. | Interpret the various types of data along with critical evaluation . | BT 5 |
| C011. | Design and develop a detail project report | BT 6 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|---|-----------|
| Unit 1 | Identification of research problem / topic on any one of the following aspects (preferably of local area / Gram Panchayat / Revenue circle / District / State) during the 3rd semester:- Any kind of geographical studies on socio-economic / cultural issues / demographic problems and characteristics The topic selection / modification may be done just before the 2nd Semester End Examination so that the data collection can be done during semester break. OR Internship in institutes, organizations, and firms of repute in Northeast India. | 24 |
| Unit 2 | Preparation of project report in prescribed format during 6th - 8th week of the commencement of course of 3rd semester. Submission of the report after a week of the announcement of routine for 3rd End Semester Examination. Final project presentation by each student using PowerPoint during on the scheduled date of viva-voce examination of this paper. OR Preparation of internship report in prescribed format during 6th - 8th week of the commencement of course of 3rd semester. Submission of the report after a week of the announcement of routine for 3rd End Semester Examination. | 24 |
| | Total | 48 |

Note: Students will work as an intern during the semester break for 4 weeks after 4th semester. Students not being able to obtain any internship will be assigned project work from the department.

Text Books:

As per the list of given in the syllabus for other papers

Reference Books:

As per the list of given in the syllabus for other papers

SEMESTER IV

| | | | | |
|------------------------------------|---|------------------------|----------------------------------|----------------------|
| Paper I Core Course | GEOGRAPHY OF POPULATION AND GENDER | | | Subject Code: |
| | L-T-P-C: 4-0-0-4 | Credit Units: 4 | Scheme of Evaluation: (T) | GEO164C401 |

Course Objectives: *The course aims to make students understand different concept related to population and their characteristics.*

Course Outcomes:

| By the end of this course the students will be able to: | | |
|---|---|-----------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| C01. | Tell about the basic definitions and concepts related to population geography and human settlements. | BT 1 |
| C02. | Outline the population parameters of India. | BT 2 |
| C03. | Apply and analyse the resultant impact of contemporary issues related to population on society and environment. | BT 3 |
| C04. | Analyse contemporary issues related to population dynamics and environment. | BT 4 |
| C05. | Determine clear exposition of spatial and structural characteristics of human settlements. | BT 5 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|---|-----------|
| Unit 1 | Field of Population Geography, Basic concepts of Population Geography: under population, optimum population, over population, population explosion and population pressure, Population resource relationship, population-resource regions, World population distribution and growth, components of population growth: fertility, mortality, migration. | 10 |
| Unit 2 | Population composition: age, sex, child women ratio and other related factors, Demographic transition model and theories of population Growth (Malthus, Sadler and Ricardo), Population policies in developed and developing economies; Gender and Space: Safety, Mobility, Exclusion; Spatial patterns of gender disparities in sex ratio differentials, female literacy, work force participation; gender, health and access to healthcare; land ownership and property rights; patterns of participation in local and national politics. | 14 |
| Unit 3 | Defining the field and scope of Settlement Geography and its approaches, origin and growth of settlement: rural and urban, types and pattern of settlement, concepts of rural-urban dichotomy, continuum and urban fringe, urban system (Law of primate city and rank size rule). | 10 |
| Unit 4 | Concept of urbanization and westernisation, functional classification of urban settlements, internal structure of cities / settlement hierarchy with reference to central place theory (Christaller and Losch): Measurement of centrality, nodality and hierarchy | 14 |
| | Total | 48 |

Text Books:

1. Singh R.Y. (Rep. 2010) - Geography of Settlements, ShardaPustakBhawan, Allahabad
2. Chandna R. C. (Rep.2010) – A Geography of Population, Concepts, Determinants and Patterns, Kalyani Publishers, New Delhi.
3. Maurya S.D (Rep. 2018): Settlement Geography, ShardaPustakBhawan, Allahabad
4. Sandram, K. V. and Nangia, S., (eds): Population Geography, Heritage Publishers, New Delhi. Inc., New York.
5. Ghosh, S. (2015) Introduction to Settlement Geography, Orient Black Swan Private Ltd., Kolkata.

Reference Books:

1. Clarke, J. I., 1972: Population Geography, Pergamon Press, Oxford.
2. Peters, G. L. and Larkin, R. P., 1979: Population Geography: Problems, Concepts and Prospects, Kendall/ Hunt Iowa.
3. Trewartha, G. T., 1969: A Geography of Population: World Pattern, John Wiley & Sons.
4. Woods, R., 1979: Population Analysis in Geography, Longman, London.
5. Robinson, H., 1981: Population and Resources, Macmillan Press, London
6. Kaushik, S.D. (2010) ManavBhugol, Rastogi Publication, Meerut.
7. Maurya, S.D. (2012) ManavBhugol, ShardaPustakBhawan, Allahabad.

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|-------------------------------------|--|------------------------|----------------------------------|----------------------|
| Paper II Core Course | ENVIRONMENT AND SUSTAINABLE DEVELOPMENT | | | Subject Code: |
| | L-T-P-C: 4-0-0-4 | Credit Units: 4 | Scheme of Evaluation: (T) | GE016C404 |

Course Objectives: *The course aims to give the idea of the concept of global environment and its impact on various aspects, along with providing knowledge on adaptation and mitigation of climate impacts and also to know institutional role in it.*

Course Outcomes:

| By the end of this course the students will be able to: | | |
|---|---|-----------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| CO1. | Relate to basics of science of environmental change and sustainable development. | BT 1 |
| CO2. | Classify different types of natural resources and its importance. | BT 2 |
| CO3. | Develop understanding about various impacts of Climate Change on Agriculture and Water, Flora and Fauna, Human Health, ozone layer and other spheres of environment. | BT 3 |
| CO4. | Inspect upon the issues of adaptation and mitigation from hazards and management of solid wastes. | BT 4 |
| CO5. | Explain the policies of development and environmental protection in developed and developing countries. | BT 5 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|--|-----------|
| Unit 1 | Introduction to Environment: definition and concept, types, Environmental factors, The Global Environment and its segments and development, Natural resources: renewable and non-renewable, land resources, water resource, forest resource and energy resource | 12 |
| Unit 2 | Man- environment relationship: Historical perspectives on man's interaction with environment; population growth and environment; Man and atmosphere: Man as a factor of climatic change; Global environmental problems: Types and extent of environmental problems, area-specific major environmental issues and problems. | 12 |
| Unit 3 | Concept of sustainability, concept of sustainable development, history, : relation among environment, economy and society, Pillars and principles of Sustainable development, Environmental Pollution- causes and effects, Nuclear Hazard and Human Health, Solid Waste Management, Climate Change and Global warming, ozone layer depletion and its impacts | 12 |
| Unit 4 | Environmental protection movements: Chipko Movement, Silent Valley, Narmada Bachhao Andolan; Environmental Legislation Programme in India: Wildlife Protection Act, Water Act, Forest Act, Air Act, Environmental Protection Act, International Agreement-Earth Summit, UNFCCC, Montreal and Kyoto Protocol, Environmental Communication and Awareness | 12 |
| | Total | 48 |

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|----------------------------------|----------------------------------|------------------------|------------------------------------|----------------------|
| Paper III Core Course | Biodiversity Conservation | | | Subject Code: |
| | L-T-P-C: 2-0-4-2 | Credit Units: 2 | Scheme of Evaluation: (T+P) | GE0164C403 |

Course Objectives: *This course intends to make the students understand the importance of biodiversity and its conservation*

Course Outcomes:

| After the completion of the course, the students will have the ability to: | | |
|--|---|-----------------------|
| Sl. No. | Course Outcome | Blooms Taxonomy Level |
| CO1 | Build ideas on importance of biodiversity | BT1 |
| CO2 | Analyse the ways of biodiversity conservation at micro, meso and macro level | BT2 |
| CO3 | Interpret the various techniques of biodiversity conservation | BT3 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|---|-----------|
| Unit 1 | Threats: Factors causing biodiversity degradation, Concept of species extinction. Traditional Conservation Practice: Traditional Ecological Knowledge and documentation of local biodiversity. | 6 |
| Unit 2 | Species Conservation Techniques: In situ conservation (Biosphere Reserves, National Parks, Wildlife Sanctuaries, Conservation Reserves, Community reserves, Sacred Habitats), | 6 |
| Unit 3 | Ex-situ conservation (Botanical & Zoological Gardens, Gene Banks, Seed And Seedling Banks, Pollen Culture, Tissue Culture and DNA banks, Butterfly Gardening); Concept of Biodiversity Hotspots and Mega-diversity Country; Role of captivity in wildlife management. | |
| Unit 4 | Habitat Conservation Techniques: Concept of Habitat, Habitat Management, Habitat Edge improvement, Role of Corridor in Wildlife Management, Ecological Restoration Programme; Social Forestry; Agro Forestry; Joint Forest Management | |
| | Total | 24 |

Text Books:

- Creswell, J., (1994). **Research Design: Qualitative and Quantitative Approaches**. UK: Sage Publications.
- Dikshit, R. D. (2003). **The Art and Science of Geography: Integrated Readings**.

Reference books:

- Evans, M. (1988). Participant Observation: The Researcher as Research Tool. In Eylesand, J and D. Smith (eds). **Qualitative Methods in Human Geography**. Cambridge, UK: Polity.
- Mukherjee, N. (2002). **Participatory Learning and Action: with 100 Field Methods**. Delhi, India: Concept Pubs. Co.
- Stoddard, R. H. (1982). **Field Techniques and Research Methods in Geography**. USA: Kendall/Hunt.
- Wolcott, H. (1995). **The Art of Fieldwork**. CA, USA: Alta Mira Press.

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|-------------------------------------|-----------------------------|----------------------------------|
| Paper IV Core Course | GEOGRAPHY OF TOURISM | Subject Code: |
| L-T-P-C: 4-0-0-4 | Credit Units: 4 | Scheme of Evaluation: (T) |
| | | GEO164C404 |

Course Objectives: *The course aims to make the students define the basic theme and concepts of tourism geography and interpret the geographical components of tourism.*

Course Outcomes:

| By the end of this course the students will be able to: | | |
|--|--|------------------------------|
| SI No. | Course Outcome | Blooms Taxonomy Level |
| CO1. | Define the geographical aspects that organise economic space. | BT 1 |
| CO2. | Illustrate the geographical aspects of tourism in an area. | BT 2 |
| CO3. | Develop practical field knowledge about tourist places across India. | BT 3 |
| CO4. | Analyse the knowledge gathered through field visits and prepare their respective reports. | BT 4 |
| CO5. | Justify the methods of tourist flow in relation to the geographical setting of an area. | BT 5 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|----------------|---|----------------|
| Unit 1 | Meaning, Scope and contents of Geography of tourism: Definition of tourism and its scope; Factors influencing tourism: historical, natural, socio cultural and economic, Importance of geography in tourism, Types of tourism, Constituents of tourism industry | 10 |
| Unit 2 | Concept of Sustainable tourism: Definition and principles of sustainable tourism, Dimensions of sustainability, Impact of tourism - Environmental, Social, Cultural, and Economic; Concept of Responsible tourism, Global environmental change and tourism, concept of carrying capacity | 14 |
| Unit 3 | Resources of Tourism: Destination and resource factors, Mass tourism vs. alternative tourism, Ecotourism, Spatial pattern of Tourism Resources in India-National Parks, Wild life sanctuaries, Tiger Reserves, Biosphere reserves & wetlands., history and culture | 10 |
| Unit 4 | Understanding tourism system: Leiper's Model, Tourist map design, Travel Flows: models, trends and types, Important tourist destination of India, Tourist destinations in North America, South America, Europe, Africa, Antarctica, Australia and Asia, latitude, longitude and international date line | 14 |
| | Total | 48 |

Text Books:

1. Bhatia, A. K., 1996: Tourism Development: Principles and Practices, Sterling Publishers, New Delhi.
2. Milton, D., 1993: Geography of World Tourism Prentice. Hall, New York.
3. Sharma J. K. (ed.), 2000: Tourism Planning and Development - A new perspective, Kanishka Publishers, New Delhi.

Reference Books:

1. Robinson, H., 1996: A Geography of Tourism. Macdonald and Evans, London, 1996.
2. Williams Stephen, 1998: Tourism Geography, Routledge, Contemporary Human Geography Series, London.
3. Shaw G. and Williams A. M., 1994: Critical issues in Tourism-A Geographical Perspective, Oxford: Blackwell.

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|--------------------|--|------------------------|----------------------------------|--|
| Core Course | Report Writing on Socio-economic Issues | | | Subject Code: GEO162C4 25 |
| | L-T-P-C: 0-0-8-4 | Credit Units: 4 | Scheme of Evaluation: (P) | |

Course Objectives: *This paper provides an understanding the basics of research project preparation.*

Course Outcomes:

| After successful completion of the course, the students will be able to: | | |
|--|--|-----------------------|
| Sl. No. | Course Outcome | Blooms Taxonomy Level |
| C01 | Relate real world issues for carrying out research on a specific field | BT1 |
| C02 | Infer ideas of research through literature review. | BT2 |
| C03 | Develop hypothesis and research questions. | BT3 |
| C04 | Identify appropriate sampling techniques. | BT4 |
| C05 | Interpret the various types of data along with critical evaluation . | BT5 |
| C06 | Design and develop a detail project report | BT6 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|---|-----------|
| Unit 1 | Identification of research problem / topic on any one of the following aspects (preferably of local area / District / State) Any kind of geographical studies on socio-economic / cultural issues / demographic problems and characteristics The topic selection / modification may be done just before the 2nd Semester End Examination so that the data collection can be done during semester break. | 12 |
| Unit 2 | Preparation of Literature Review from the identified problem of research | 12 |
| Unit 3 | Preparation of questionnaire, Field visit, Primary data collection, Secondary data review. | 12 |
| Unit 4 | Generation of report (within about 100 A4 size pages including 30-40 maps/diagrams/field photographs) on the basis of field works carried out under , Final project presentation by each student using PowerPoint during on the scheduled date of viva-voce examination of this paper. | 12 |
| | Total | 48 |

Note: Students will work as an intern during the semester break for 4 weeks after 4th semester. Students not being able to obtain any internship will be assigned project work from the department.

Text Books:

As per the list of given in the syllabus for other papers

Reference Books:

As per the list of given in the syllabus for other papers

| | | | | |
|--------------------|-------------------------|-------------------------|----------------------------------|----------------------|
| Core Course | RESEARCH (Major) | | | Subject Code: |
| | L-T-P-C: | Credit Units: 12 | Scheme of Evaluation: (P) | GEO164C426 |

Learning Objectives: The course aims to make the students understand how to approach a research problem and to formulate research objectives and research questions in proper perspective, formulation of hypothesis and testing, framing of questionnaires, techniques of collection of both qualitative and quantitative data and their analysis.

Learning Outcomes:

| After the completion of course, the students will have ability to: | | |
|--|---|-----------------------|
| CO No. | Course Outcome | Blooms Taxonomy Level |
| CO12. | Choose appropriate research methods for carrying out research on a specific field. | BT 1 |
| CO13. | Infer ideas and classify the issues that needs attention for formulation of hypothesis. | BT 2 |
| CO14. | Develop hypothesis and research questions. | BT 3 |
| CO15. | Identify appropriate sampling techniques. | BT 3 |
| CO16. | Interpret the various types of data along with critical evaluation . | BT 5 |
| CO17. | Design and develop a detail project report | BT 6 |

Detailed Syllabus:

| Modules | Topics and Course Content | Periods |
|---------|---|---------|
| Unit 1 | <p>Identification of research problem / topic on any one of the following aspects (preferably of local area / Gram Panchayat / Revenue circle / District / State) during the 3rd semester while working with a minor project by the individual student:- Any kind of geographical studies on socio-economic / cultural issues / demographic problems and characteristics</p> <ol style="list-style-type: none"> Agriculture, Industry, Mining related issues Environmental problems of the locality including disasters and hazards Natural resources assessments, planning and management Ecological crisis, Climate change and consequences Rural / Urban Ecosystems; Terrain / basin / watershed characterization and evaluation including integrated development studies <p><i>(This list is indicative only, the student may consult the assigned teacher as project supervisor / guide. Project supervisor / guide to each student will be allocated).</i> The topic selection / modification may be done just before the 3rd Semester End Examination so that the data collection can be done during semester break. A fresh project proposal / modified project proposal of minor project done in 3rd semester is to be submitted by each student (within 2nd week of the commencement of 4th semester classes) by mentioning the following:-</p> <ol style="list-style-type: none"> Project title Introduction to the problem Aims / objectives Research questions Database and Methodology Study of relevant literature Organization of study <p><i>Marks for internal evaluation = 14</i></p> | 12 |
| Unit 2 | <p>Project proposal presentation by each student using PowerPoint during 3rd week of the commencement of the course of 4th semester.</p> <p><i>Marks for internal evaluation = 14</i></p> | 12 |
| Unit 3 | <p>Reporting of data collection, tabulation, processing, mapping/charting and analysis by each student using PowerPoint during 5th week of the commencement of the course of 4th semester.</p> <p><i>Marks for internal evaluation = 14</i></p> | 12 |

| | | |
|--------|--|-----------|
| Unit 4 | Preparation of project report in prescribed format during 6th - 8th week of the commencement of course of 4th semester. Submission of the report after a week of the announcement of routine for 4th End Semester Examination. Final project presentation by each student using PowerPoint during on the scheduled date of viva-voce examination of this paper. <i>Marks for external evaluation = Viva-voce 8 + Presentation 20 = 28</i> | 12 |
| | Total | 48 |

Note: Submission of project report in prescribed format and on specified date is mandatory. Equal weightages of marks for each stage of the work (upto 3rd stage) for internal evaluation of the project by the supervisor (60% of end semester examination). 40% of the total marks of end semester examination is for viva-voce and final presentation to be evaluated by an external examiner.

Text Books:

As per the list of given in syllabus based on topic selected

Reference Books:

As per the list of given in syllabus based on topic selected