



**Parvatibai Chowgule College of Arts and Science**  
**Autonomous**

Accredited by NAAC with Grade 'A' (CGPA Score 3.41 on a 4 Point Scale in 3rd cycle)  
Best affiliated College-Goa University Silver Jubilee Year Award

## **LEARNING OUTCOME-BASED EDUCATION (LOBE)**

for

**Undergraduate Programme**  
**BA GEOGRAPHY**  
**(LOCF)**



**DEPARTMENT OF GEOGRAPHY**  
**PARVATIBAI CHOWGULE COLLEGE OF ARTS &**  
**SCIENCE (AUTONOMOUS)**  
**MARGAO GOA**

## Introduction

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 the 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 the 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 globalized urban landscape at different levels, from the local/regional/national to global.

Geography as a discipline has undergone constant change due to socio-economic dynamics, demographic changes and technological advancements. Geography has adopted global to micro-level studies 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 important for the policy makers to consider the geo-spatial aspects with references to the location and in 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.

Ever since the inception of the college in 1962, geography is being offered for Bachelor of Arts students. Initially, it was offered as three units. From 1991, six units (entire geography) is being offered. The main focus of the discipline is physical geography, human geography, cartography, regional planning, quantitative techniques and participatory appraisal techniques. The curriculum has adopted Learning Outcomes based Approach. It incorporates dynamic processes including fundamental and modern techniques, global initiatives like Sustainable Development Goals (SDGs), Disaster Risk Reduction (DRR), 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 that could address India's developmental challenges. Geography uses scientific knowledge with the current focus that includes spatio-temporal analysis, skill development, Remote Sensing and Geographic Information System.

## Aim of B.A Programme in Geography

The Department has defined aims and objectives of B.A. Programme in Geography in its Mission Statement which is as follows:

### Mission Statement:

The Department of Geography at Chowgule College aims to provide in-depth knowledge in geographical domains with a special focus on research and skill-building.

It offers core subjects in Physical Geography, Cultural Geography, Geoinformatics, Cartography, Spatial Studies and an array of allied electives. The teaching learning methodologies focus on self focused learning through problem based learning, laboratory experiments, field works and project works.

The faculty has expertise in specialized fields of geography, which ensure that their experience is transcended to the students through discussion forums, workshops, seminars, field works and research work. The department emphasizes that the students participate in intercollegiate events, present papers in conferences, assist faculty in research works and undertake internships.

Our department has the necessary ICT-enabled infrastructure to enable curious learners to acquire essential skills and knowledge. This helps to develop expertise in areas of spatial studies, physical geography, human geography and Geoinformatics.

The department aims to develop skills of fieldwork, survey and research to seek suitable employment as teachers, researchers, surveyors, GIS analysts, cartographers and in allied fields like tourism and regional planning.

Students interested in joining the department, should have passed Higher secondary (12<sup>th</sup> Grade) and should be genuinely interested in field work and surveys. The students need to have some basic knowledge in statistics and should be curious observers and report writers.

The above specified aims and objectives are achieved through the below mentioned courses offered to B.A. Geography students

Sr. No.	Mission Key points	Methodology
1	In-depth knowledge	GEG-I.C1, GEG-I.C2, GEG-II.C3, GEG-II.C4
2	Research	GEG-III.E3, Project Work, GEG-VI.E16
3	Skill-building	Problem Solving, Lab experiments, fieldworks, internships, workshops, seminars, group discussions, classroom presentations, research paper presentations
4	Physical Geography	GEG-I.C2, GEG-III.E2, GEG-V.C7
5	Cultural Geography	GEG-II.C3, GEG-IV.E7, GEG-V.E11, GEG-V.E12, GEG-VI.C8
6	Geoinformatics	GEG-III.E4, GEG-III.SC5, GEG-III.SE2, GEG-III.SE4
7	Cartography	GEG-I.C1, GEG-I.C2, GEG-III.C5
8	Spatial Studies	GEG-II.C3, GEG-II.C4, GEG-III.E1, GEG-III.E2, GEG-IV.E5, GEG-IV.E6, GEG-VI.E13 GEG-VI. E13, GEG-IV.C6

Eight distinct key-points have been incorporated from B.A. Course such as: In-depth knowledge, Research, Skill-building, Physical Geography, Cultural Geography, Geoinformatics, Cartography and Spatial Studies. This helps students to:

- i. Appreciate the relevance of geographical knowledge to everyday life.
- ii. Demonstrate the ability to communicate geographic information by utilising both lecture and practical exercises.
- iii. Inculcate the ability to evaluate and solve geographical problems effectively.
- iv. Demonstrate the skills in using geographical research tools including spatial statistics, cartography, Participatory Rapid Appraisal techniques, remote sensing, and Geographic information systems.
- v. Based on the field knowledge and advanced technologies, the students should be able to understand the on-going geographical problems in different regions and levels with appropriate solutions.

## Overview of the Department

We are proud to state that Department of Geography and Research Centre is a leading and pioneer department in the State of Goa that offers Graduate, Postgraduate and Ph.D. programmes in Geography and Postgraduate Diploma in Geoinformatics.

Well equipped laboratories, well qualified faculty with strong academic background, collaborations with various national and international institutes, active involvement in consultancy, extension activities and research and an established GIS and Remote Sensing section are the fortes of the department.

Over the decades, the department has achieved significant milestones since its inception in 1962. Looking at the popularity and demand of Geography, in 1991, entire Geography was introduced at third year level and then, subsequently, Masters' Degree (M.A.), in 2004. To increase the employability of graduates, in 2009, the department started Postgraduate Diploma in Geoinformatics (PGDGIS), and to enhance the research aptitude, Ph.D. Programme commenced from 2014. B.Sc. in Geography at third year level was introduced in 2012.

The department, to its credit, has completed four, with two ongoing Major Research Projects and more than 60 research publications in last five years. The department also publishes an in-house bi-monthly newsletter "***Geographia***" and undertakes various activities through Geography Club "**GLOBE** (Geographers Loving Our Beautiful Environment)" and "**AGES** (Association of Geography Ex-Students)". The GLOBE organizes field trips, tours, students' events and works for the promotion of the subject, where as AGES provides financial and logistic assistance. Various scholarships have been instituted by the alumni.

The department has collaborations with Goa Institute of Public Administration and Rural Development (GIPARD), Old Goa, (Goa), Gogate-Jogalekar College, Ratnagiri (Maharashtra), Parishkar College of Global Excellence, Jaipur (Rajasthan), S.M. Bapuji Salunkhe Mahavidyalaya, Miraj (Maharashtra) and Department of Geography, University of Rajasthan, Jaipur (Rajasthan). There are two universities, University of Sri Jayewardenepura and University of Kelaniya, Sri Lanka, with whom, the department has academic exchange programmes.

The departments commitment to the growth of the subject and expansion of geographical knowledge through teaching, research, consultancy and extension activities, has earned it, a stature of being one of the most eminent academic departments in the State of Goa.

### Infrastructure

The Department has independent laboratories with adequate infrastructure supported by computer facility and Internet connection and air conditioning. A well-developed Geographical Information System (GIS) Lab, Remote Sensing Lab and Photogrammetry & Research Lab cater to the needs of the students and researchers. The department is enriched with toposheets (Indian and British), weather charts, maps, globe, models and specimens of rocks and minerals. The Department is proud to have an automatic weather station installed by ISRO (Indian Space Research Organization) that provides continuous weather report. The department also has GPS and Mapmaker package.

**Department Labs:**

1. Geoinformatics Lab
2. P.G. Laboratory (Geomorphology Lab), which is currently being re-developed as Environmental Lab
3. Photogrammetry & Research Lab with tracing table
4. Remote Sensing Lab
5. General Lab
6. Mapping Room

**Scholarships**

The Department institutes three awards for the students of Geography.

1. **The Pratima Naik Memorial Award** is awarded to top scorer in the subject and girl student scoring highest marks in geography at undergraduate and postgraduate examinations respectively.
2. **The M.S. Honrao and Dr. S. S. Hiremath Scholarship** is awarded to needy meritorious postgraduate students of first year and second year respectively.
3. **The Late Afroz Sheik Memorial Scholarship** is awarded to a postgraduate student scoring highest in Semester I & II and who is economically disadvantaged.
4. **Dr. N. N. Sawant and Dr. S. S. Hiremath Scholarship for GIS Study** is awarded to a postgraduate student scoring highest in Geoinformatics and who is economically disadvantaged.

**Courses Offered**

The Department of Geography is the only department in the State of Goa to provide higher education at third year graduation level and at postgraduate level.

**Degree Courses:**

- B.A. Geography
- B.Sc. Geography
- M.A. in Geography
- M.Sc. in Geoinformatics

**Diploma Course:**

- Postgraduate Diploma in Geoinformatics

**Ph.D. Programme in Geography:**

- The Department is recognized as Center for Research in Geography by the Goa University

**EDUSAT based Distance Learning Programme:**

- Basic and Advanced Remote Sensing, GIS and GPS sponsored by NNRMS and ISRO

**Short Term Courses in the field of GIS and Remote Sensing** (Announced as per requirement)

**Three Years Integrated Programme : Bachelors of Arts and Science in Geography**

Geography is one of the most exciting subjects to study at any level. It is the study of places and the relationships between people and their environments. Geographers explore both the physical properties of Earth's surface and the human societies spread across it. Geography is unique in bridging the social sciences (human geography) with the natural sciences (physical geography). Geography asks the big questions — Where? How? Why? What if? — and gives you the perspective to answer them with advanced technology and a solid knowledge of the

world in which we all live. "Geography is the only subject that asks you to look at the world and try to make sense of it. The field never stops being exciting because that's what geography is all about - trying to make sense of the world." (Peirce F. Lewis)

The department of Geography at Parvatibai Chowgule College offers an array of courses that lays a firm foundation in geography and also enables students to develop skills of field work, cartography, map reading, research and report writing.

The three years integrated programme has 120 academic and 10 non academic credits. It is divided into three components: Foundation courses, Core and Elective courses.

### Semester-wise Distribution of Courses for BA and BSc Geography

Semester	Single Major	Major-Minor (Major)	Double Major	Minor
I	2 Core Courses	2 Core Courses	2 Core Courses	1 Core Course
II	2 Core Courses	2 Core Courses	2 Core Courses	1 Core Course
III	1 Core Course 3 Elective Courses	1 Core Course 1 Elective Course*	1 Core Course 1 Elective Course*	1 Core Course
IV	1 Core Course 3 Elective Courses	1 Core Course 1 Elective Course*	1 Core Course 1 Elective Course*	1 Core Course
V	1 Core Course 3 Elective Courses	1 Core Course 2 Elective Courses*	1 Core Course	1 Core Course
VI	1 Core Course 3 Elective Courses	1 Core Course 2 Elective Courses*	1 Core Course	1 Core Course
<b>Total</b>	<b>8 Core Courses 12 Elective Courses</b>	<b>8 Core Courses 6 Elective Courses</b>	<b>8 Core Courses 2 Elective Courses</b>	<b>6 Core Courses</b>

\*Note: Number of Electives is irrespective of the Semesters in which they are opted

**1. Foundation courses :** These are compulsory courses that are offered in each semester. The total number of credits is 36.

- 1.1 Languages (English, Hindi, French, Portuguese, Marathi, Konkani)
- 1.2 Statistical methods (Advanced)
- 1.3 Academic Writing
- 1.4 Research writing
- 1.5 Interdisciplinary (Semester V and VI)
- 1.6 Environmental Science
- 1.7 Cyber Security

**2. Core Courses** are offered for the students opting for Single Major, Major- Minor and Double Major. The department offers 8 core papers for Single Major and double Major students, while Major – Minor and Minor Students will offer six core papers.

<b>Compulsory Core (BA Geography)</b>	<b>Single Major</b>	<b>Major-Minor</b>	<b>Double Major</b>	<b>Minor</b>
Introduction To Geography	•	•	•	•
Fundamentals Of Physical Geography	•		•	-
Basics Of Human Geography	•	•	•	-

Basics Of Regional Geography	•	•	•	•
Cartography	•	•	•	•
Advanced Regional Geography & Development	•	•	•	•
Basics of Geomorphology	•	•	•	•
Fundamentals of Population Geography	•	•	•	•

<b>Compulsory Core (BSc Geography)</b>	<b>Single Major</b>	<b>Major-Minor</b>	<b>Minor</b>
Fundamentals Of Physical Geography	•	•	•
Basic Cartographic Techniques	•		-
Oceanography	•	•	-
Geography of Man-Environment Interaction	•	•	•
Fundamentals of Remote Sensing and GIS	•	•	•
Fundamentals of Geomorphology	•	•	•
Fundamentals of Climatology	•	•	•
Ecology and Terrestrial Environment	•	•	•

**3. Electives:** The department offers 16 electives in four semesters ( III,IV, V & VI). Single major students have to choose 12 electives of the listed in odd and even semesters Where as major – minor students will choose 6 electives and double major students will choose 2 electives. The department offers no electives for students opting geography as a minor subject.

### **3.1 Electives offered in the odd semesters (B.A. Geography) ( Semester III & V)**

- E-1 Socio- Economic Survey
- E-2 Field Survey In Physical Geography
- E-3 Participatory Rapid Appraisal Techniques
- E-4 Application of Computer in Geography
- E-9 Basics of Climatology
- E-10 Basics of Oceanography
- E-11 Geography of Rural Settlements
- E-12 Geography of Urban Settlements

**Pre requisite:** For courses E-9, E-10, E-11 and E-12 , a student must have successfully completed courses in physical geography and human geography.

### **3.2 Electives offered in the odd semesters (B.Sc. Geography) ( Semester III & V)**

- E-1 Spatial Analysis
- E-2 Raster and Vector Data Models in GIS
- E-3 Participatory GIS
- E-4 Applied GIS
- E-9 Geography of Soil Studies
- E-10 Agro-Meteorology: Principles and Applications
- E-11 Field Survey in Physical Geography
- E-12 Quantitative Techniques in Geography



**Pre requisite:** For courses E-1, E-2, E-3 and E-4 , a student must have successfully completed courses in Basic GIS and Remote Sensing

### **3.3 Electives offered in the even semesters (B.A. Geography) (Semester IV & VI)**

- E-5 Regional Geography of Goa
- E-6 Regional Geography of India
- E-7 Regional Geography of South Asia (Sri Lanka)
- E-8 Regional Geography of USA
- E-13 Regional Planning
- E-14 Economic Geography
- E-15 Geography of Tourism
- E-16 Quantitative Techniques in Human Geography

**Pre requisite:** For courses E-5, E-6, E-7 and E-8, a student must have a student must have successfully completed courses in Basics & Advanced Regional Geography.

### **3.4 Electives offered in the even semesters (B.Sc. Geography) ( Semester IV & VI)**

- E-5 Coastal Geomorphology
- E-6 Fluvial Geomorphology
- E-7 Watershed Management
- E-8 Biogeography
- E-13 Remote Sensing and Forest Ecology
- E-14 Applications of GIS in Coastal Processes
- E-15 Ecology of Marine Environment
- E-16 Landscape and Disaster Management

**Pre requisite:** For courses E-5 and E-6, a student must have a student must have successfully completed courses in Physical Geography and Basic Geomorphology. For Courses E+13 and E-14, a student must have a student must have successfully completed courses in Basic Remote Sensing and GIS.

Any student aspiring to earn extra credits should get due approval from the Head of the Department.

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Students interested in joining the department, should have passed Higher secondary (12th Grade) and should be genuinely interested in field work and surveys. The students need to have some basic knowledge in statistics and should be curious observers and report writers.

### **Research and Consultancy**

Research and Consultancy is one of the key strengths of the department. Over the last five years, the following research and consultancy activities have been carried out in the department:

- **Major Research Projects**

- i. Tourism and Socio- cultural Impacts: A study of selected Tourist Destinations of Salcete, Goa sponsored by ICSSR. (2012 – 2014); Chief Investigator: Dr. Nandkumar N. Sawant
- ii. “Goa: Socio-cultural Transformations and Adaptations in the Post Liberation Era” sponsored by UGC (2012-2014), Chief Investigator: Dr. Nandkumar N. Sawant
- iii. Development of GPS Collar for Wildlife Study, funded by Chowgule Education Society ( 2010 -12 ), Chief Investigator: Dr. Sanjay Gaikwad
- iv. Assessment of Carbon Stock and Carbon Sequestration Scenario through Land Use Change in the State of Goa, sponsored by University Grants Commission, New Delhi (2015-2017), Chief Investigator: Dr. Sanjay Gaikwad

- **Minor Research Projects**

- i. Velips in Goa – their society, problems and prospects” funded by University Grants Commission, Chief Investigator: Mrs. Anagha Bicholcar

- **Consultancy**

- i. 2010-11: Study of Climate Change & Impact on rural Masses: Maharashtra, for Peaceful Society
- ii. 2014: Socio-Economic Survey (Impact of Mining in Goa) for Department of Town & Country Planning, Goa
- iii. 2016: Field Techniques and Village Survey for The IIS University, Jaipur, Rajasthan
- iv. 2011: GIS Software Training Programme on “Basic and Advanced Course in ArcGIS Desktop” under Hydrology Project Phase II for Water Resources Department, Ponda, Goa
- v. 2011: “Retrieving and Transferring data from MS-DOS to AutoCAD” for Department of Forest, Working Plan Division, Ponda, Government of Goa
- vi. 2012: Summer Training Programme in Geospatial technologies and Applications under NRDMs Programme in DST funded by Ministry of Science and Technology, New Delhi
- vii. 2012: “Village Information System” for Surla and Velgeum Village of Bicholim Tahsil, Goa funded by Goa Mineral Ore Exporter’s Association, Panaji, Goa

- viii. 2012: “DGPS Survey and Digitization of Mining Leases” for SESA Goa Ltd., funded by Directorate of Mines and Geology, Government of Goa
- ix. 2012: “Plantation along the Mangroves at the Proposed site of Yacht Haven (Goa) Pvt. Ltd., along Zuari River near Sankavale site, Funded by Yacht Heaven Goa Pvt. Ltd, Goa
- x. 2013: Emergency Escape Route for Disaster Management for Parvatibai Chowgule College, Margao, Goa
- xi. 2014: Winter Training Programme in Geospatial Technology and Applications under NRDMS Programme in DST funded by Ministry of Science and Technology, New Delhi
- xii. 2015: Winter Training Programme in Geospatial Technology under NRDMS Programme in DST funded by Ministry of Science and Technology, New Delhi

## Graduate Attributes in Geography

The curriculum uses Choice Based Credit System framework. It has Core Course, Skill Enhancement Course, Elective - Discipline Specific and Elective - Generic Courses. The core courses cover key areas of geography about which all students should have basic knowledge. These courses are grouped as follows:

- i) **Theory** – These courses build up the theoretical and conceptual foundations of geography.
  - ii) **Practical** – Every course has a practical component which is equal to 1 credit (25 marks)
  - iii) **Fieldwork and institutional visits** are an integral part of practical component in all the courses in Geography. It helps to strengthen the methodological and practical foundations of geography.
  - iv) **Regional Approach** – courses like Basics of Regional Geography, Participatory Rapid Appraisal Techniques, Regional Geography of India, Geography of Rural Settlements, Geography of Urban Settlements, Fundamentals of Economic Geography, Introduction to Regional Planning, Geography of Population Growth focus regional aspects.
  - v) **Application Oriented** – This includes Socio-Economic Survey, Field Survey in Physical Geography, Rapid Appraisal Techniques, Computer in Geography, Quantitative Techniques in Geography, Geography of Tourism.
- At the end of the three year gradation, the students are expected to have the following attributes.
- a) Conceptual clarity in the subject.
  - b) Ability to apply the conceptual knowledge to day to day activities/real time events
  - c) Research and analytical aptitude
  - d) Team work skill and team dynamics management skills
  - e) Soft skills- oratory skills, public speaking skills, writing skills, personal grooming, mannerisms and work place etiquettes
  - f) Ability to work independently

## **Qualification Descriptors for B.A. Programme in Geography**

- a) The qualification descriptors for the B.A. programme in Geography shall have the learning attributes such as field knowledge, use of advance tools and techniques for better comprehension of space and society etc.
- b) It also involves awareness among the students regarding the issues of different regions and socio-cultural aspects.
- c) The main qualification descriptors for the geography B.A students are to develop the critical evaluation and understanding.
- d) Demonstrate systematically geographical knowledge and understanding the theoretical as well as practical applications with understanding of various aspects.
- e) Demonstrate the ability to understand the significance of geographical aspects in relation to development of the regions and minimizing regional inequalities.
- f) Demonstrate the ability and geographical thinking critically regarding rural and urban spaces and their day to day problems with the application of geographical knowledge.
- g) Students have to demonstrate their geographical knowledge acquired in the class and apply the same in real world.
- h) Recognise the scope of geography in terms of exploring the career opportunities.
- i) Employment and life-long engagement in teaching and utilise the knowledge for publication for the future academic endeavours.
- j) The students have to develop the ability through the theoretical and practical means for realising the Sustainable Development Goals (SDG) both in rural and urban spaces to minimize the inequalities in developmental aspects.

## **The Programme Learning Outcomes B.A. Programme in Geography**

- The programme learning outcomes relating to B.A Programme in geography:
- Demonstrate the understanding of basic concepts in geography.
- Demonstrate the coherent and systematic knowledge in the discipline of geography to deal with current issues and their solution.
- Display an ability to read and understand maps and topographic sheets to look at the various aspects on the space.
- Cultivate ability to evaluate critically the wider chain of network of spatial aspects from global to local level on various time scales as well.
- Recognize the skill development in Geographical studies programme as part of career avenues in various fields like teaching, research and administration.
- It is also suggested that after the completion of B.A. students should be able to demonstrate the knowledge obtained in such way so that they can explore the employability options and service to the society.



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## **Programme Learning Outcomes (PLO)**

Name of the Department: Bachelor of Arts in Geography

Programme Outcomes (PLO)	Short Title of the PLOs	Description of the Programme Outcomes  Graduates will be able to :	Mapping (achievements of course outcome)	
			Course Code	COs No
PLO-1	Problem Analysis and Solutions	Think critically, identify, analyze problems/ situations and further attempt to design/ develop solutions that meet the specified goals.	GEG-I.C1	CO1, CO5,
			GEG-I.C2	CO1, CO4
			GEG-II.C3	CO1
			GEG-II.C4	CO3
			GEG-III.C5	CO1
			GEG-E1	CO1
			GEG-E3	CO1
			GEG-E4	CO1,CO2
			GEG-IV.C6	CO1,CO2
			GEG-E5	CO1, CO2
			GEG-E6	CO1
			GEG-E7	CO1
			GEG-V.C7	CO1,CO2
			GEG-E9	CO1,CO2
			GEG-E10	CO1,CO2
PLO-2	Use of Technology	Apply appropriate IT tools efficiently in their daily activities of communication and academics.	GEG-E12	CO1, CO2
			GEG-VI.C8	CO1,CO2, CO5
			GEG-E13	CO1,CO2
			GEG-E14	CO1,CO2
			GEG-I.C1	CO3
			GEG-III.C5	CO2,CO3,CO4
			GEG-E2	CO1, CO2,
			GEG-E4	CO3, CO4
			GEG-IV.C6	CO5
PLO-3	Environment and Sustainability	Analyze and attempt solutions to environmental issues and commit	GEG-E5	CO5
			GEG-E6	CO2
			GEG-V.C7	CO5
			GEG-E9	CO6
			GEG-E12	CO3, CO4
			GEG-E16	CO1,CO4
			GEG-I.C1	CO2
			GEG-I.C2	CO2,CO3
			GEG-II.C4	CO1,
			GEG-IV.C6	CO3,CO4

		themselves to sustainable development in the local/ national and global context.	GEG-E5	CO3,CO4
			GEG-E6	CO3
			GEG-V.C7	CO3
			GEG-E9	CO3,CO4
			GEG-E10	CO3,CO4
			GEG-E14	CO3,CO4
PLO-4	Ethics	Recognize and understand professional ethics /human values and be responsible for the same.	GEG-II.C3	CO2
PLO-5	Individual and Team work	Function effectively at various levels, capacities and situations.	GEG-IV.C6	CO6
			GEG-E6	CO5
			GEG-E9	CO5
			GEG-E12	CO6
PLO-6	Communication	Communicate proficiently (oral and written) as a responsible member of society.	GEG-E12	CO7
			GEG-VI.C8	CO6
PLO-7	Research Aptitude	Understand general research methods and be able to analyse, interpret and derive rational conclusions.	GEG-II.C3	CO3,CO4,CO5
			GEG-II.C4	CO2, CO4, CO6,CO7
			GEG-E1	CO2, CO4
			GEG-E2	CO4
			GEG-E6	CO4
			GEG-V.C7	CO3,CO4
			GEG-E12	CO5
			GEG-VI.C8	CO3, CO4
			GEG-E13	CO3,CO4
			GEG-E16	CO2,CO3
PLO-8	Life Skills	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of domain specific change.	GEG-I.C1	CO4
			GEG-II.C4	CO5
			GEG-III.C5	CO5,CO6
			GEG-E1	CO3
			GEG-E2	CO3
			GEG-E3	CO2, CO3, CO4
			GEG-E4	CO5
			GEG-E5	CO6
			GEG-E6	CO2,CO3,CO4
			GEG-E16	CO5

- GEG-11- Is Not Floated/Offered



**Parvatibai Chowgule College of Arts and Science  
(Autonomous)  
Department Of Geography  
Three Year B.A. Degree Course In Geography  
Course Structure  
Updated On 16<sup>th</sup> March 2020**

<b>SEMESTER</b>	<b>CORE</b>		<b>ELECTIVE</b>			
I	GEG-I.C1: Introduction to Geography	GEG-I.C2: Fundamentals of Physical Geography				
II	GEG-II.C3: Basics of Human Geography	GEG-II.C4: Basics of Regional Geography				
III	GEG-III.C5: Cartography		GEG-E1: Socio- Economic Survey	GEG-E2: Field Survey in Physical Geography	GEG-E3: Participatory Rapid Appraisal Techniques	GEG-E4: Application of Computer in Geography
IV	GEG-IV.C6: Basics of Geomorphology		GEG-E5: Basics of Climatology	GEG-E6: Basics of Oceanography	GEG-E7: Regional Geography of India	GEG-E8: Regional Geography of USA
V	GEG-V.C7: Geomorphology: Landforms and Processes		GEG-E9: Geography of Climate Change	GEG-E10: Oceans: Issues and Challenges	GEG-E11: Geography of Rural Settlements	GEG-E12: Geography of Urban Settlements
VI	GEG-VI.C8: Geography of Population Growth		GEG-E13: Introduction to Regional Planning	GEG-E14: Fundamentals of Economic Geography	GEG-E15: Geography of Tourism	GEG-E16: Quantitative Techniques in Geography

## **Course Description**

Geography 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, pedagogy process includes:

- Identifying and explaining the physical and cultural characteristics globally and processes at varied spatio-temporal contexts.
- Acquire cartographic skills
- Critically analyze various processes that take place in lithosphere, hydrosphere, atmosphere
- Understand the regional dimensions and dynamics
- Understanding human-environment and nature-society interactions as well as various global environmental challenges.
- Responding towards the global and national challenges and initiatives.

## Program specific learning outcomes (PSLO)

After successful completion of a Bachelor's Arts degree in Geography, the student will:

Program Specific Learning outcome (PSLO)	Short Title of PSLOs	Description of the program outcomes	Course outcome mapping		TLE
PSLO 1	Basic Geographical Skills	Understand Fundamental Concepts in different domains of Geography (Physical, Human, Regional, Geospatial Technologies)	CO1	GEG-I.C1, GEG-I.C2, GEG-II.C3, GEG-II-C4, GEG-III.C5, GEG-E1, GEG-E2, GEG-E3, GEG-E4, GEG-IV.C6, GEG-E5, GEG-E6, GEG-E7, GEG-V.C7, GEG-E9, GEG-E12, GEG-VI.C8, GEG-E13, GEG-E14, GEG-E16	Classroom interaction discussion
					written test
					Assignment
					model making
					worksheet/puzzles
					Online assessment Open book test
			CO2	GEG-I.C1, GEG-IV.C6, GEG-V.C7, GEG-E10, GEG-E12, GEG-E13, GEG-E16	GOBBET
			CO3	GEG-E6, GEG-E10	
			CO4	GEG-E7, GEG-E10	
			CO6	GEG-III.C5	Semester end examination
PSLO2	Mapping & Interpretation Skills	Develop Cartographic and Computer skills	CO2	GEG-I.C2, GEG-III.C5, GEG-E7,	Session wise assessment
			CO3	GEG-I.C1,	

				GEG-I-C.2, GEG-II.C4	Base map preparation
			CO4	GEG-I.C1, GEG-I.C2, GEG-II.C4, GEG-E6, GEG-E13,	Mapping Selection of suitable cartographic techniques
					Computer based Graphical representation of data
			CO5	GEG-II.C3, GEG-II.C4, GEG-E5, GEG-V.C7	Map interpretation SOI toposheet interpretation
			CO6	GEG-II.C4, GEG-IV.C6, GEG-V.C7, GEG-VI.C8	Map Layout
			CO7	GEG-II.C4, GEG-E12	Online journal
PSLO3	Surveying and report writing Skills	Acquire skills in Social and Physical field surveys. Handling of surveying instruments Presentation of data	CO1		Field work
			CO2	GEG-E2,	Surveying
			CO3	GEG-E1, GEG-E2	Pre-field preparation
			CO4	GEG-II-C3,	Assignment
					Written test
			CO5	GEG-E9	Field verification and ground truthing
			CO6	GEG-E5, GEG-E9,	Error identification and rectification
PSLO4	Communication, Academic and Research Writing Skills, Soft Skills	Acquire Participatory Field-based Learning through PRA Techniques (Communication, Writing Skills, Soft Skills)	CO1		Project report
			CO2	GEG-E3,	Research review
			CO3	GEG-E3, GEG-VI.C8	Questionnaire based survey
			CO4	GEG-E3, GEG-E14	Field work
			CO5	GEG-II.C4, GEG-E12	Timeline preparation
			CO6		Transect walk
			CO7		Community resource mapping
					Communication

					Team work Skills
					Social communication skill
					Daily schedule preparation
					Interview and dialogue
					Trend analysis
					Focused group discussion
PSLO5	Analytical and problem solving skills	Have a basic understanding of Quantitative Techniques in Geography and their real-life applications	CO1		Data collection
			CO2	GEG-II.C3, GEG-II.C4, GEG-E1, GEG-E5, GEG-E6, GEG-E9, GEG-VI.C8, GEG-E14,	Data processing
			CO3	GEG-I.C1, GEG-II.C3, GEG-II.C4, GEG-IV.C6, GEG-E5, GEG-E7, GEG-V.C7, GEG-E9, GEG-E12, GEG-13, GEG-E14, GEG-E16,	Data analysis
					Graphical and diagrammatic
			CO4	GEG-II.C4, GEG-II.C4, GEG-E5, GEG-V.C7, GEG-E9, GEG-E12, GEG-VI.C8,	presentation Development of hypothesis Testing hypothesis Drawing inferences
PSLO6	Application of	Use of computer	CO5	GEG-I.C1, GEG-II.C4, GEG-VI.C8	
			CO6		
			CO7		
			CO1		Handling

	Geo-spatial Technology	for cartographic techniques Use of GPS, DGPS, satellite data, open source software , Mobile technology			software Use of remotely
			CO2	GEG-E4,	sensed data
			CO3	GEG-E4,	Handling
			CO4	GEG-E1, GEG-E2, GEG-E4, GEG-E16,	hardware Data collection Using mobile technology
			CO5	GEG-E4, GEG-E6, GEG-E16	Web application Use of open source software
			CO6	GEG-E12,	
			C07		

## **10. (a) Teaching Learning Processes**

Learning Outcomes based Curriculum Framework (LOCF) for geography 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, food security, water security, energy security, biodiversity, disaster management, human health and wellbeing and livelihood security.

The approaches are to make geography more scientific and societal-need oriented that could be the panacea of India's development. Geography uses scientific knowledge with the present focus that includes spatio-temporal analysis, skill development, GIScience, sustainable development and human security.

Learning is a challenging, engaging, and enjoyable activity. Learners should be encouraged to engage in a rigorous process of learning and self-discovery by adopting a highly focused and yet flexible approach to education.

- Each day learners should be encouraged to focus on key areas of the course and spend time on learning the course fundamentals and their application in life and society.
- In teaching and learning pedagogy, there should be a shift from domain or conclusions based approach to the experiential or process based approach.

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

- Identifying and explaining the physical and cultural characteristics globally and processes at varied spatio-temporal contexts.
- Understanding human-environment and nature-society interactions as well as various global environmental challenges.
- Analyzing geographic information by using geo-spatial technologies.
- Responding towards the global and national initiatives.

Broad framework for teaching in the class includes:

1. Theory courses should have 3 hours per week for courses carrying 4 credits.
2. Practical courses should have 2 hours per week.

In order to achieve its objective of focused process based learning and holistic development, the Institution/University may use a variety of knowledge delivery methods:

### **10 a(i). Lectures**

Lectures are designed to provide the learners with interesting and fresh perspectives on the subject matter. Lectures are interactive in a way that students work with their teachers to get new insights in the subject area, on which they can build their own bridges to higher learning.

### **10 a(ii). Discussions**

Discussions are critical components of learning, and are used as a platform for students to be creative and critical with old and new ideas. Besides developing critiquing skills, arriving at consensus on various real life issues and discussion groups lead to innovative problem solving and, ultimately to success.

**10 a(iii). Life Skills:**

Life skills provide students opportunities to understand real life situations and scenarios (i.e. coping with disaster), and solve challenges in a controlled environment or make use of them in simulating cultural experiences by locating/transposing them in new (local, regional, national and international) situations.

**10 a(iv). Case Studies:**

Case studies, wherever possible, are encouraged in order to challenge students to find creative solutions to complex problems of individual, community, society and various aspects of knowledge domain concerned.

**10 a(v). Team Work**

Positive collaboration in the form of teamwork is critical in the classroom environment, for which it is necessary to transcend one's prejudices and predilections so as to achieve the desired outcomes. In the process of teamwork, learners will acquire the skills of managing knowledge acquisition and other collaborative learners, thereby understanding how to incorporate and balance personalities.

**10 a(vi). Study Tours/Field Visits:**

Study Tours/ Field trips provide opportunities to the learners to test their in-class learning in real life situations as well as to understand the functional diversity in the learning spaces. These include visits to sites of knowledge creation, preservation, dissemination and application.

**10 a(vii). Academics-Industries Interface:**

The course curriculum of B.A. encourages students for closer interaction with industries/corporate/research institutes, etc. for at least 120 hours (4 Credits) internship and training.

**10 (b) Assessment Methods:**

The assessment of students' achievement in geography is aligned with course/program learning outcomes and the academic and geographical skills that the program is designed to be developed. Different assessment methods that are appropriate within the discipline of geography are used. Learning outcomes are measured through continuous evaluation using the oral and written examinations, cartographic and computer based exercises (GIS), practical assignments, observations of practical skills, project and field work reports, seminar presentations and viva voce.



## Activities of the Department

### Students Activities

- **Inter-collegiate Geography Event “Geographize”**

‘Geographize’ is a unique one-day geography event in the state of Goa, organized to promote geography as a subject and encourage interaction between geography students of various colleges. Usually organized around September, Geographize is a platform for students to exhibit their geographical skills through various activities like treasure hunt using geographical instruments, Quiz competition, Poster making, Model making, skit, Documentary making, Map Jig-saw and many more. Colleges and Universities in and around Goa, participate in this event.





## Academic Exchange Programme, Sri Lanka

The Academic Exchange Programme, which is open to students and faculty of social sciences, is organized in two phases: one, wherein, faculty and students from one or more Universities of Sri Lanka, visit our college or allied institutes, and, second, wherein, students and faculty from our college visit the Universities in Sri Lanka. The primary objective is to provide an opportunity to understand the socio-cultural life, tourism, rural development and other aspects in Sri Lanka and also to foster academic relationship between the two countries. One of the main highlights of the Exchange Programme is the Indo-Sri Lankan Conference, which provides a platform for the students and faculty to present their research papers at international level.



- Collaborative Research, Fieldwork and other Activities under MoU's with University of Rajasthan, Jaipur; Gogate Jogalekar College, Ratnagiri, Maharashtra, Mother Care Hospital, Margao, Goa, Goa Institute of Public Administration and Rural Development (GIPARD), Ela, Old Goa, University of Kelaniya, Sri Lanka, University of Sri Jayewardenepura, Sri Lanka
- **World Population Day**  
World Population Day is observed every year on 11<sup>th</sup> July to create awareness about population growth and related issues. Various competitions and activities are organized as part of the event.
- **Hiroshima-Nagasaki Day**  
Understanding the need to sensitize students to global and national issues and help them become responsible members of the society, Hiroshima-Nagasaki day is observed since 2002, every year in August, to bring forth the issue of human disaster that occurred in 1945 in Japan and subsequently the contemporary issues that are happening around us. The event is a tribute to the victims of Hiroshima and Nagasaki atomic bombings.



- **“Geographia” – Department Newsletter**  
Department publishes an in-house bi-monthly newsletter which publishes articles about recent geographical events and reports departmental activities.
- **AGES (Association of Geography Ex-students)**  
AGES is an effort to stay connected with our ex-students and their progress in their respective fields of career. Also, members of AGES contribute to the betterment of the department by instituting scholarships to the disadvantaged and meritorious students.
- **Organization & Participation in various Seminars, Conferences, Workshops & training Programmes**  
Department of Geography organizes various Seminars, Conferences, Workshops & training Programmes at State, National and International levels for two main reasons: one is to interact with researchers worldwide. And second, to encourage students and faculty to exhibit their research and presentation skills and also to share views and

opinions on related themes. Similarly, training programmes and workshops help students to acquire and hone their knowledge about recent geographical domains.

- **Special Lectures by Guest Faculties**

Department invites academicians and experts from renowned institutes to conduct special lectures for Geography students.

- **Activities conducted by Geography Club GLOBE (Geographers Loving our Beautiful Environment)**

The Geography club organizes various activities for students to create awareness about environmental issues and help students to appreciate and care for the environment. Monsoon Trek is one such event that is organized on the first Sunday of August every year.

- **Surveys, Field Trips and Study Tours**

Geography is not just about classroom learning. An active Geographer is the one who learns to apply the geographical skills in real world. Surveys, Fieldtrips and Study Tours provide that opportunity and make learning geography, a fun-filled experience.

- **Consultancies & Extension Activities**

Consultancies and Extension services are offered by the department to help individuals or organizations to achieve innovation and objectives in related geographical fields.

# **Syllabus for Autonomous Courses in Geography**

## **Bachelor of Arts**

**Semester I**  
**Updated On 16<sup>th</sup> March 2020**

### **CORE**

**Course Title: Introduction to Geography (Theory)**

**Course Code: GEG-I.C1**

**Marks: 75**

**Credits: 3**

**Duration: 45 lectures of 1 hour each**

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**Prerequisite Courses: Nil**

### **Course Objectives:**

1. To acquaint the students with distinctiveness of Geography as a field of learning.
2. The philosophy of the subject is to be taught in order to develop a keen interest in the subject and to pursue it for higher studies.

**Course outcomes:** At the end of this course, students will be able to:

**CO1:** Understand fundamental concepts and dichotomies in geography

**CO2:** Analyze the interrelationships among fundamental concepts of geography

**CO3:** Acquire Basic cartographical skills such as basic elements of map and map reading, area measurements, time calculation

**CO4:** Differentiate and evaluate different domains of geography

<b>Unit No.</b>	<b>Course Content</b>	<b>No. of hours</b>	<b>Marks</b>
I	<b>Introduction of Geography</b> Definition, Meaning, nature and scope of geography; Major divisions of geography Major themes in Geography – location, region, process, spatial interaction and time.	15	25
II	<b>Introduction to Geosphere: I</b> <b>Atmosphere:</b> Meaning & Definitions-Composition& Structure of Atmosphere, Elements of Weather & Climate and their inter-relation. <b>Biosphere &amp; Nanosphere</b> Major Natural regions of world	15	25
III	<b>Introduction to Geosphere: II</b> <b>Lithosphere:</b> Evolution of Earth, Geological Time scale. Orders of Relief (I, II, III), oceans and continents, classification of mountains, plateau and plains <b>Hydrosphere:</b> Hydrological Cycle Spatial distribution of water on earth.	15	25
		45	75

**References:****Mandatory:**

1. Goh Cheng Leong (2003): Certificate Physical and Human Geography, Oxford university press, New Delhi

**Supplementary:**

1. Dikshit R.D (2004): The Arts, Science of Geography, Integrated Readings Prentice Hall of India, New Delhi
2. Lal. D. S. (2007): Climatology, Pushtak Mahal, Allahabad
3. Das Gupta and Kapoor (2013): Principles of Physical Geography, S. Chand & Company Pvt. Ltd.
4. Singh Savindra (2005): Environmental Geography, Prayag Pustak Bhavan, Allahabad

**Web-based:**

1. <https://player.uacdn.net/lesson-raw/7B40WVPQTFRB0H1UF10H/pdf/7647790894.pdf>
2. <https://scied.ucar.edu/atmosphere-layers>
3. [https://d43fweuh3sg51.cloudfront.net/media/assets/wgbh/tdc02/tdc02\\_doc\\_biomesummary/tdc02\\_doc\\_biomesummary.pdf](https://d43fweuh3sg51.cloudfront.net/media/assets/wgbh/tdc02/tdc02_doc_biomesummary/tdc02_doc_biomesummary.pdf)
4. [https://www.researchgate.net/publication/225491377\\_The\\_early\\_evolution\\_of\\_the\\_planet\\_earth\\_and\\_the\\_origin\\_of\\_life](https://www.researchgate.net/publication/225491377_The_early_evolution_of_the_planet_earth_and_the_origin_of_life)
5. [https://www.nap.edu/resource/12161/origin\\_and\\_evolution\\_of\\_earth\\_final.pdf](https://www.nap.edu/resource/12161/origin_and_evolution_of_earth_final.pdf)
6. [https://www.researchgate.net/publication/315125743\\_THE\\_HYDROLOGIC\\_CYCLE](https://www.researchgate.net/publication/315125743_THE_HYDROLOGIC_CYCLE)

**CORE****Course Title: Measurement Systems in Geography (Practical)****Course Code: GEG-I.C1****Marks: 25****Credits: 01****Duration: 15 sessions of 2 hours each**  
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Unit	Title	Practical sessions	Marks
I	1. Scales and its types: a. Verbal Statement. b. Representative Fraction. 2. Linear scale- a. Simple and comparative- b. time and distance 3. Identification of location and extension based on latitude and longitudes. 4. Grid reference system. 5. Finding directions. 6. Calculation of time based on longitude 7. Calculation of area by square method	10	15
II	8. Preparation of map – Title, Scale, Legend, Direction, Signs and symbols, lettering and colour scheme.	05	05
III	Journal		5
		15	25

**References:****Mandatory:**

1. Misra, R.P. and Ramesh, A., (2005): Fundamentals of Cartography, Concept Pub. Co., New Delhi

**Supplementary:**

1. Campbell, J.(2004) Introductory Cartography, Prentice Hall, Inc Englewood
2. Monkhouse, I.J. and Wilkinson, H.R., (2009): Maps and Diagram, B.I. Publication, New Delhi
3. R. P Mishra. (2014) Fundamentals of Cartography, Concept Pub. Co., New Delhi
4. Gopal Singh. (2014), : Map Work and Practical Geography, 4<sup>th</sup> Edition, Sterling Book House Mumbai

**Web-based:**

1. [http://groundwater.fullerton.edu/Maps,\\_Scale,\\_GIS\\_and\\_GPS/Guide\\_to\\_Map\\_Scale.html](http://groundwater.fullerton.edu/Maps,_Scale,_GIS_and_GPS/Guide_to_Map_Scale.html)
2. <https://www.timeanddate.com/geography/longitude-latitude.html>
3. <https://www.youtube.com/watch?v=ei5FAinKXoY>
4. <https://www.mathopenref.com/squarearea.html>
5. <http://www.fao.org/economic/the-statistics-division-ess/world-census-of-agriculture/conducting-of-agricultural-censuses-and-surveys/chapter-5-cartographic-preparation/en/>

**CORE****Course Title: Fundamentals of Physical Geography (Theory)****Course Code: GEG-I.C2****Marks: 75****Credits: 3****Duration: 45 lectures of 1 hour each**

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**Prerequisite Courses: Nil****Course Objectives:**

1. The course aims to introduce fundamental concepts of physical geography.
2. The course focuses on various spheres of the earth and their related concepts.

**Course Outcomes:** At the end of this course, students will be able to:**CO1:** Understand fundamentals of physical geography**CO2:** Apply techniques to represent different relief features**CO3:** Interpret the characteristics and associate with other relief features**CO4:** Analyze and interpret climate data

Unit No.	Course Content	No. of hours	Marks
I	<b>Concept and Nature:</b> Introduction to physical geography Recent developments in physical geography. <b>Layers of the Earth:</b> Lithospheric system: Interior of the earth. Layering of the earth- Mechanical layering and chemical layering. Weathering and mass movement, Rocks and its types. Soil- definition and profile.	15	25
II	<b>Basic concepts of climatology:</b> Definition and scope of climatology Insolation, factors affecting Insolation and Heat budget. Temperature, atmospheric pressure, wind, and humidity	15	25
III	<b>Introduction to oceanography-</b> Definition, Development of oceanography as a discipline, Significance and scope of oceanography	15	25
		45	75

**References:****Mandatory:**

1. Bloom, Arthur L., 2008: Geomorphology – A Systematic Analysis of Late Cenozoic Landforms, Prentice Hall, Engle Wood Cliff, New Jersey.
2. Dayal, P. (2nd edition) 2006: A Textbook of Geomorphology, Shukla Book Depot, Patna
3. Strahler, A.N., 2005: Physical Geography, 3rd Ed., Wiley Publications
4. Singh, S. 2005: Physical Geography, Prayag Pustak Bhawan, Allahabad
5. Lal, D.S , 2004: Oceanography, Prayag Pustak Bhavan, Allahabad



**Supplementary:**

1. Ahmed, E., 2005: Geomorphology, Kalyani Publishers, New Delhi
2. Sharma, V.K., 2006: Geomorphology, Earth Surface, Process and forms, Tata McGraw Hill, New York
3. Thornbury, W.D., 1969: Principles of Geomorphology, 2nd Ed., Wiley International Edition, Wiley Eastern Reprint, 2004
4. Wooldridge, S.W. and Morgan, R.S., 2008: The Physical Basis of Geography, Longman (First published in 1937)
5. Worcestor, P.G., 2005: A Textbook of Geomorphology, Van Nostrand, 2nd Ed., East West Edition, New Delhi.
6. Chorley, Richard J., 2002: Spatial Analysis in Geomorphology, Harper and Row Publishers, New York, London.
7. Sharma, H.S. (ed), 2002: Perspective in Geomorphology, Vol. I & IV, Concept, New Delhi.
8. Sharma, V.K., 2006: Geomorphology, Earth Surface Processes and Forms, Tata Mc. Graw Hill, New Delhi.
9. Sparks, B.W., 2000: Geomorphology, Longman, London, 2nd edition.

**Web-based:**

1. <https://www.nationalgeographic.org/media/earths-interior/>
2. <https://www.nationalgeographic.org/encyclopedia/rock-cycle/>
3. [http://www.geo.hunter.cuny.edu/~fbuon/GEOL\\_231/Lectures/Weathering%20and%20Mass%20Wasting%20Part%202.pdf](http://www.geo.hunter.cuny.edu/~fbuon/GEOL_231/Lectures/Weathering%20and%20Mass%20Wasting%20Part%202.pdf)
4. <http://ncert.nic.in/textbook/pdf/kegy209.pdf>
5. <https://www.ukessays.com/essays/geography/history-significance-oceanography-9589.php>

**CORE****Course Title: Fundamentals of Physical Geography (Practical)****Course Code: GEG-I.C2****Marks: 25****Credits: 1****Duration: 15 sessions of 2 hours each**

Unit	Title	Practical Sessions	Marks
I	1. Methods of Representation of Relief features a. Spot Heights, b. Bench Marks. c. Triangulation mark 2. Contours diagrams for slopes with cross sections- gentle slope, steep slope, concave and convex slope, 3. Contours diagrams for hills, plateaus, cliff 4. Contours diagrams for V-shaped valley, waterfall, rapids, river terraces 5. Profile Drawing from contour diagram. a. Serial b. Superimposed c. composite	10	15
II	6. Calculation of mean, average, range of temperature. 7. Calculation of lapse rate and Relative Humidity.	5	05
III	Journal	15	05

**References:****Mandatory:**

1. Chorley, Richard. J. (ed.), 2009: Water, Earth and Man, Methuen & Co., London
2. King, C.A.M., 2006: Techniques in Geomorphology, Edward Arnold, London
3. Monkhouse, F.J. and Wilkinson, H.R., 2009: Maps and Diagrams, B.I. Publications Pvt. Ltd., New Delhi
4. Singh, R.L. and Singh Rana P.B., 2008, Elements of Practical Geography, Kalyani Publishers, New Delhi

**Supplementary:**

1. Goudie, Andrew, et al. (eds), 2001: Geomorphological Technique, George Allen & Unwin, London
2. Gregory, K.J. and Walling, D.E., 2003: Drainage Basin – Form and Process, Edward Arnold, London
3. Leopold, L.B, Wolman, M.G. and Miller, J.P., 2004: Fluvial Processes in Geomorphology, Freeman, San Francisco
4. Misra, R.P. and Ramesh, A., 2009: Fundamentals of Cartography, Concept Publishing Co., New Delhi

**Web-based:**

1. [http://www.brainkart.com/article/Methods-of-Representing-Relief-Features\\_33844/](http://www.brainkart.com/article/Methods-of-Representing-Relief-Features_33844/)
2. <https://www.slideshare.net/gauravlath1997/contour-diagrams>
3. [https://geo.libretexts.org/Bookshelves/Ancillary\\_Materials/Laboratory/Book%3A\\_Laboratory\\_Manual\\_For\\_Introductory\\_Geology\\_\(Deline%2C\\_Harris\\_and\\_Tefend\)/03%3A\\_Topographic\\_Maps/3.6%3A\\_Drawing\\_Contour\\_Lines\\_and\\_Topographic\\_Profiles](https://geo.libretexts.org/Bookshelves/Ancillary_Materials/Laboratory/Book%3A_Laboratory_Manual_For_Introductory_Geology_(Deline%2C_Harris_and_Tefend)/03%3A_Topographic_Maps/3.6%3A_Drawing_Contour_Lines_and_Topographic_Profiles)
4. <https://sciencing.com/calculate-mean-annual-temperature-7236109.html>
5. [https://eesc.columbia.edu/courses/ees/climate/lectures/atm\\_phys.html](https://eesc.columbia.edu/courses/ees/climate/lectures/atm_phys.html)

**Semester II**  
**Updated on 16<sup>th</sup> March 2020**

**CORE**

**Course Title: Basics of Human Geography (Theory)**

**Course Code: GEG-II.C3**

**Marks: 75**

**Credits: 3**

**Duration: 45 lectures of 1 hour each**

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**Prerequisite Courses: Nil**

**Course Objectives:**

1. The course provides the basic conceptual framework of Human Geography.
2. It focuses on cultivating basic knowledge through understanding and analysis of the fundamental concepts in Human geography.

**Courses Outcomes:** At the end of this course, students will be able to:

**CO1:** Understanding of fundamental concepts of Human Geography

**CO2:** Understand and analyze human related issues in societies

**CO3:** Develop an understanding of basic quantitative techniques used in Human geography

**CO4:** Collect, process and analyze socio economic data

**CO5:** Visually illustrate population data

Unit	Topic	No. of hours	Marks
I	<b>Concept and Nature:</b> Meaning, Scope and Development of Human Geography. Basic principles-Principle of Activity or Change, Principle of Terrestrial Unity or whole. Approaches in human geography (humanistic, scientific, welfare and behavioral)	15	25
II	<b>Society and Culture</b> Evolution of man (Australopithecus, Homo Erectus, Homo sapiens. Man's spread over the earth during the Pleistocene). Culture- meaning and components. Language and religion. (Classification, distribution, issues and challenges.) Contemporary social problems: Gender disparity and related issues Ethnicity and the related issues. (Case study of India).	15	25
III	<b>Indicators of Development:</b> L.D.C. and M.D.C.-social, economic and demographic. (Distribution and Density. Concepts of under population, over population, age and gender composition. Fertility, mortality, migration, Ageing population.) Demographic transition.	15	25
		45	75

Note: The course should focus on basic conceptual aspects.

**References:****Mandatory:**

1. Hussain, M. (2004) *Human Geography*. Rawat Publication. New Delhi.
2. H.J De Blij, Alexander B. Murphy, Erin H. Foubert (2007) *Human Geography: People, Place and Culture*. John Wiley and sons. USA.

**Supplementary:**

1. Panigrahi P.K. (2011) *Human Geography-Landscape of Human Activities*. Murari Lala and sons. New Delhi.
2. Sharma Y.K. (2007) *Human Geography*. Lakshmi Narain Agrawal, Agra.
3. Rubenstein J M (2010) *Contemporary Human Geography*. PHI learning Pvt., New Delhi.
4. Chandna, R.C. (2006) *Geography of Population*. Kalyani Publishers. New Delhi
5. Hagget, P. (2002) *Geography: A Modern Synthesis*. Harper & Row, New York
6. De Blij, H.J., *Human Geography, Culture, Society and Space*, John Wiley, New York, 2006
7. Fellman, J.L. *Human Geography-Landscapes of Human Activities*, Brown and Benchmark, Pub. U.S.A. 2007.
8. Arun Kumar Sharma, 2012: *Principles of Human Geography*, Rastogi Publications, Meerut

**Web-based:**

1. [https://researchguides.dartmouth.edu/human\\_geography](https://researchguides.dartmouth.edu/human_geography)
2. <https://freegeobook.files.wordpress.com/2009/01/0761942637.pdf>
3. <https://www.britannica.com/science/human-evolution>
4. <https://ourworldindata.org/economic-inequality-by-gender>
5. <https://pages.uwc.edu/keith.montgomery/Demotrans/demtran.htm>

**CORE****Course Title: Basics of Human Geography (Practical)****Course Code: GEG-II.C3****Marks: 25****Credits: 1****Duration: 15 sessions of 2 hours each**  
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Unit.	Title	Practical sessions	Marks
I	Calculation and interpretation of: 1. Fertility measures: Crude Birth Rate, General Fertility Rate 2. Mortality measures: Crude Death Rate, Infant Mortality Rate. 3. Age data Analysis: Age and gender composition 4. Construction of Population Pyramid	8	10
II	5. Literacy measures: Crude Literacy Rate. Gross Enrolment Ratio. 6. Work Participation Ratio. 7. Per capita income 8. GDP	7	10
III	Journal and viva		5
		15	25

**References:****Mandatory:**

1. Bose, Ashish et. al., 2004: Population in India's Development, Vikas Publishing House, New Delhi
2. Chandna, R.C. Geography of Population: Concept, Determinants and Patterns, Kalyani Publishers, New York 2000.

**Supplementary:**

1. Bogue, D. J., 2001: Principles in Demography, John Wiley, New York
2. Census of India, 2001, India: A State Profile
3. Crook, Nigel, 2007, Principles of Population and Development. Pergmon Press, New York.
4. Daugherty, Helen Gin, Kenneth C.W. Kammeryir (2008) An Introduction to Population (Second Edition). The Guilford Press, New York, London
5. Mitra, Asok, 2008, India's Population. Aspects of quality and Control Vol. I & II. Abhinav Publication. New Delhi.
6. Srinivasan, K. and M. Vlassoff, 2001. Population Development Nexus in India: Challenges for the New Millennium. Tata McGraw Hill, New Delhi.
7. Srinivasan, K. Basic Demographic Techniques and Applications Sage Publications, New Delhi 2008.
8. UNDP, 2000: Human Development Report Oxford University Press, Oxford.
9. United Nations, 2004, Methods for Projections of Urban and Rural Populations. No. VIII, New York.

10. Woods, R., 2009: Population Analysis in Geography, Longman, London.
11. Sawant & Athavale, 2005: Population Geography, Mehta Publishing House, Pune.

**Web-based:**

1. <https://ourworldindata.org/fertility-rate>
2. <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/3130>
3. [https://censusindia.gov.in/census\\_and\\_you/gender\\_composition.aspx](https://censusindia.gov.in/census_and_you/gender_composition.aspx)
4. <https://www.britannica.com/topic/population-pyramid>
5. [https://censusindia.gov.in/Census\\_Data\\_2001/India\\_at\\_glance/workpart.aspx](https://censusindia.gov.in/Census_Data_2001/India_at_glance/workpart.aspx)

**CORE****Course Title: Basics of Regional Geography (Theory)****Course Code: GEG-II.C4****Marks: 75****Credits: 3****Duration: 45 lectures of 1 hour each**

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**Prerequisite Courses: Nil****Course Objectives:**

1. The course aims to develop a basic understanding of the regions and recognizing the significance of geography in shaping region.
2. It helps students to appreciate regional unique dimensions of regions.

**Course Outcomes:** At the end of this course, students will be able to:**CO1:** Understand Fundamental concepts of regional geography**CO2:** Apply techniques of regionalization**CO3:** Differentiate among different regions spatial organization and areal variation in human activities.**CO4:** Develop an understanding of basic quantitative techniques used in regional geography.**CO5:** Develop the skill of calculation of different indicators of development.**CO6:** Diagrammatically represent and interpret regional data**CO7:** Represent and interpret characteristics of various regions.

Unit	Title	No. of hours	Marks
I	Concept of Region in Geography: Definition and characteristic The Regional Approach - area, region, space Factors of regionalization ii) Methods of Regionalization- methods of delineation of region, types of regions,	15	25
II	i.) Foundations of Region - Ecological, Economic, Social and Cultural Dimensions ii.) Federalism-center – state relationships. iii.) Core – Periphery iv.) Hierarchy of regions, v.) Regional Consciousness and Identity. vi.) The Regional issues. (Two case studies)	15	25
III	Study of Regional Organization: Their evolution, functions and inter-linkages. Globalization and the New Territorial Order.	15	25
		45	75



**References:****Mandatory:**

1. Singh, R.L., 2001 (ed): India – A Regional Geography, National Geographical Society, India
2. Paul Claval, 2003, *An Introduction to Regional Geography*, , Rawat Publication, Jaipur & Delhi

**Supplementary:**

1. Cole, J. 2000: *A Geography of the World's Major Regions*, Routledge, London
2. Israel, S. Johnson, D.I. and Wood, D., 2005: *World Geography Today*
3. Jackson, R.H. and Hudman, L.E, 2007: *Regional Geography: Issues for Today*.
4. Wheeler, J.H. Jr. and Kostbade, J.T., (1990): *World Regional Geography*, Holt Rinsort and Winston, Inc
5. Holier, G.P., 2008: *Regional Development in Michael Pacione (ed), The Geography of the 3rd World: Progress & Prospects*, Rutledge, London, New York.
6. Jackson, R.H. and Hudmar, L.E. 2004: *Regional Geography: Issues for Today*
7. Paul Claval (2008) *An Introduction to Regional Geography*, Wiley-Blackwell, ISBN 155786733X.

**Web-based:**

1. [https://shodhganga.inflibnet.ac.in/bitstream/10603/39734/12/12\\_chapter%202.pdf](https://shodhganga.inflibnet.ac.in/bitstream/10603/39734/12/12_chapter%202.pdf)
2. [https://issuu.com/rengasamy/docs/regional\\_planning\\_part\\_ii\\_types\\_of\\_regions\\_\\_regio](https://issuu.com/rengasamy/docs/regional_planning_part_ii_types_of_regions__regio)
3. <https://www.insightsonindia.com/2014/11/13/regionalism-dimensions-meaning-issues/>
4. [https://link.springer.com/chapter/10.1007/978-3-319-18971-0\\_7](https://link.springer.com/chapter/10.1007/978-3-319-18971-0_7)
5. <https://www.longdom.org/open-access/from-globalization-to-regionalism-and-interregionalism-a-study-ofsaarc-2332-0761-1000279.pdf>
6. [https://institutdelors.eu/wp-content/uploads/2018/01/regionalism\\_globalgovernance\\_t.behr-j.jokela\\_ne\\_july2011\\_01.pdf](https://institutdelors.eu/wp-content/uploads/2018/01/regionalism_globalgovernance_t.behr-j.jokela_ne_july2011_01.pdf)

**CORE****Course Title: Basics of Regional Geography (Practical)****Course Code: GEG-II.C4****Marks: 25****Credits: 1****Duration: 15 sessions of 2 hours each**

Unit	Topic	Practical Sessions	Marks
I	Methods of Regional Demarcation: 1. Demarcation of agricultural regions (crop combination and diversification) 2. Gravity model, 3. Breaking point Analysis, 4. Sphere of Urban Influence 5. Population potential surfaces	08	10
II	6. Network Analysis 7. Nearest Neighbor index, 8. Centro graphic analysis	07	10
III	Journal and viva		05
		15	25

**References:****Mandatory:**

1. Hegget Peter, Cliff A.D. et. al. (2001) Locational Methods, Locational Analysis in Human Geography, Vol. II Arnold – Heinemann Pub. (India)

**Supplementary:**

1. Hegget Peter, Cliff A.D. et. al. (2000) Locational Models, Locational Analysis in Human Geography. Vol. I Arnold – Heinemann Pub. (India)
2. Chandna R.C. (2003): Regional Planning: A Comprehensive Text, Kalyani Publishers, Ludhiana

**Web-based:**

1. <https://www.thoughtco.com/reillys-law-of-retail-gravitation-1433438>
2. <https://www.geographyforyou.com/2019/09/maximum-positive-deviation-crop.html>
3. <http://www.fao.org/3/x6906e/x6906e06.htm>
4. [https://shodhganga.inflibnet.ac.in/bitstream/10603/10376/9/09\\_chapter%201.pdf](https://shodhganga.inflibnet.ac.in/bitstream/10603/10376/9/09_chapter%201.pdf)
5. <https://karnataka.pscnotes.com/main-notes/paper-iii-general-studies-ii/urban-spheres-of-influence-and-rural-urban-fringe/>
6. [https://transportgeography.org/?page\\_id=623](https://transportgeography.org/?page_id=623)
7. <https://www.geoib.com/nearest-neighbor-index.html>
8. <https://rashidfaridi.com/2017/09/14/centrographic-techniques/>
9. <http://www.geodsz.com/eng/d/population-potential/population-potential.htm>

**Semester III**  
**Updated On 16<sup>th</sup> March 2020**

**CORE**

**Course Title: Cartography (Theory)**

**Course Code: GEG-III.C5**

**Marks: 75**

**Credits: 3**

**Duration: 45 lectures of 1 hour each**

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**Prerequisite Courses: Nil**

**Course Objectives:**

1. The course aims to provide basic cartographic concepts.
2. This forms the basis for advanced cartographic techniques.

**Course Outcomes:** At the end of this course, students will be able to:

**CO1:** Understand the basic cartographic concepts

**CO2:** Develop cartographic skills taught in the practical component of this course.

**CO3:** Understand map projections construction, properties, merits – demerits and their applications

**CO4:** Understand projections by using maps

**CO5:** Develop the skill to create basic map

**CO6:** Know the mapping organizations in India

Unit	Topic	No. of hours	Marks
I	<b>Introduction:</b> Cartography, Focuses of cartography,(geometric, presentation, symbols, layout, etc.)Scope of Cartography. Growth of modern cartography. Spatial data – Data nature and data sources. <b>Mapping Organizations in India</b> – Survey of India, NATMO,NRSCA, Lettering and color scheme in SOI Maps <b>Map symbolization:</b> Mapping qualitative data and quantitative data-using point, line and area symbols. Maps- Types- physical and cultural maps, SOI Conventional signs and symbols and Colour.	20	30
II	<b>Map projections:</b> General Principles: Classification, properties and choice of map projections. Merits and demerits. Cylindrical, conical and zenithal projections	15	25
III	<b>Introduction to topographical maps:</b> Indexing. Marginal information. Scales and gridding.	10	20
		45	75

## **References**

### **Mandatory:**

1. Sarkar, Ashis (2000), Practical Geography: A Systematic Approach, Orient Longman Pvt. Ltd., Kolkata.
2. Monkhouse, F.J. & Wilkinson, H.R., (2009): Maps & Diagrams, B.I. Publications, New Delhi

### **Supplementary:**

1. Bygott, J. (2007), An Introduction to Map work and Practical Geography,
2. Campbell, J.(2004): Introductory Cartography, Prentice Hall Inc., Englewood Cliff
3. Misra, R.P. and Ramesh, A., (2005): Fundamentals of Cartography, Concept Publishing Company, New Delhi
4. Robinson, A.H., et al: (2000)Elements of Cartography, John Wiley & Sons, New York ,
5. Raisz, E. ( 2004) Principles of Cartography, McGraw Hills, London ,
6. Singh, R. & Singh, R.: (2001) Map Work & Practical Geography, Central Book Depot, Allahabad.
7. Talukder, S., (2008): Introduction to Map Projections, Eastern Book House, Guwahati

### **Web-based:**

1. <https://www.edx.org/learn/cartography>
2. <https://www.coursera.org/courses?query=cartography>
3. [https://www.esri.com/training/catalog/596e584bb826875993ba4ebf/cartography./](https://www.esri.com/training/catalog/596e584bb826875993ba4ebf/cartography/)
4. <https://www.udemy.com/topic/cartography/>
5. <https://www.classcentral.com/tag/cartography>

**CORE****Course Title: Cartography (Practical)****Course Code: GEG-III.C5****Marks: 25****Credits: 1****Duration: 15 sessions of 2 hours each**

Unit	Topic	Practical Sessions	Marks
I	Cylindrical Projections. Mercators Equidistance and Equal area Sinusoidal Projection and Mollweide's Projection	5	07
II	Conical Projections: One standard parallel. 2 standard parallel and Equal area(Bonne's Projection)	5	07
III	Zenithal Projections: Sterographic, Gnomonic, Orthographic	5	06
IV	Journal		05
		15	25

**References****Mandatory:**

1. Sarkar, Ashis (2000), Practical Geography: A Systematic Approach, Orient Longman Pvt. Ltd., Kolkata.
2. Monkhouse, F.J. & Wilkinson, H.R., (2009): Maps & Diagrams, B.I. Publications, New Delhi

**Supplementary:**

1. Bygott, J. (2007), An Introduction to Map work and Practical Geography,
2. Campbell, J.(2004): Introductory Cartography, Prentice Hall Inc., Englewood Cliff
3. Elhance, D.N.,(2002): Fundamentals of Statistics, Kitab Mahal, Allahabad
4. Gregory, S., (2003): Statistical Methods and Geographers, Longman, London
5. Hammond, R. and McCullagh, P. (2005): Quantitative Techniques in Geography, Clarendon Press, Oxford Sarkar, Ashis, Practical Geography: A Systematic Approach, Orient Longman Pvt. Ltd., Kolkata.
6. Misra, R.P. and Ramesh, A., (2005): Fundamentals of Cartography, Concept Publishing Company, New Delhi
7. Mahmood, A., (2009): Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi.
8. Robinson, A.H., et al: (2000)Elements of Cartography, John Wiley & Sons, New York ,
9. Raisz, E. ( 2004) Principles of Cartography, McGraw Hills, London ,
10. Singh, R. & Singh, R.: (2001)Map Work & Practical Geography, Central Book Depot, Allahabad.
11. Talukder, S., (2008): Introduction to Map Projections, Eastern Book House, Guwahati

**Web-based:**

1. <http://ncert.nic.in/textbook/pdf/kegy304.pdf>
2. <https://www.geographyrealm.com/types-map-projections/>
3. <https://www.axismaps.com/guide/general/map-projections/>
4. <https://www.e-education.psu.edu/geog160/node/1918>
5. <https://web.csulb.edu/~rodrigue/geog140/lectures/projections.html>
6. <https://gisgeography.com/map-projections/>

**ELECTIVE****Course Title: Socio Economic Survey in Human Geography (Theory)****Course Code: GEG-E1****Marks: 75****Credits: 3****Duration: 45 lectures of 1 hour each****Prerequisite Courses: Nil****Course Objectives:**

1. The primary objective is to provide basic methodology in field based socio-economic survey.

**Course Outcomes:**

At the end of this course, students will be able to:

**CO1:** Understand basic concepts of Socio Economic Surveying**CO2:** Develop the skill of questionnaire formulation**CO3:** Independently collect data from field using online apps and manually**CO4:** Process, analyze, graphically represent and interpret data

Unit	Topic	No. of hours	Marks
I	Socio-economic survey in Geography: Meaning and significance indicators of development Socio-economic indicators, Sources of data, Types of data – Social, Economic, Geographical and Demographic	15	25
II	Types of surveys: Historical, Social, Descriptive and Action Surveys. Sampling Techniques. Preparation of Questionnaire, Interview, Group Discussion, Planning Strategy and Implementing of Survey.	15	25
III	Based on the objective of the Survey. Pilot Survey, Planning for Main Survey, Pre-Survey and Post Survey Work. E- Survey-Introduction to e-surveying and various sites. Safety Measures, Responsibility Sharing and Plan of Action. (a) Academic report – Literature Survey, structure, layout, reporting language (b) Comprehensive report representation – photos, sketch, maps, etc.	15	25
		45	75

**References:****Mandatory:**

1. Bagavathi, V. & Pillai R. S. N. (2005) Statistical Theory and Practice, S. Chand Publication, New Delhi.
2. Kothari, C.R., (2004) Research Methodology- Methods and techniques, New Age International (P) Limited, New Delhi.

**Supplementary:**

1. Gosh, B N (2007) Scientific Methods and Social Research, sterling Publishers Private Limited.
2. Mahmood, A., (2009): Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi.
3. Saravanavel, P.,( 2014), Research Methodology, Kitab Mahal, New Delhi
4. Singh, Gopal., (2010 ) Map Work and Practical Geography, Vikas Publishing House, New Delhi

**Web-based:**

1. <https://www.um.es/empafish/files/Deliverable%209.pdf>
2. [https://openjicareport.jica.go.jp/pdf/11810140\\_03.pdf](https://openjicareport.jica.go.jp/pdf/11810140_03.pdf)
3. <https://www.jk.gov.in/jammukashmir/sites/default/files/Socio%20Economic%20Survey%20of%20Village.pdf>
4. <https://stattrek.com/survey-research/sampling-methods.aspx>
5. <https://medcraveonline.com/BBIJ/sampling-and-sampling-methods.html>
6. <https://courses.lumenlearning.com/suny-hccc-research-methods/chapter/chapter-9-survey-research/>
7. <http://www.tools4dev.org/resources/how-to-pretest-and-pilot-a-survey-questionnaire/>

**ELECTIVE****Course Title: Socio Economic Survey in Human Geography (Practical)****Course Code: GEG-E1****Marks: 25****Credits: 1****Duration: 15 Sessions of 2 hours each**  
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Unit	Topic	Practical Sessions	Marks
I	Questionnaire Formulation Field Book Preparation Literature Survey (Cataloging)	04	05
II	Conducting on-field survey (Village, Market, Ward) E- surveying – web mapping	08	05
III	Data analysis using MS Excel and compilation	03	05
IV	Report		10
		15	25

**References:****Mandatory:**

1. Bagavathi, V. & Pillai R. S. N. (2005) Statistical Theory and Practice, S. Chand Publication, New Delhi.
2. Kothari, C.R., (2004) Research Methodology- Methods and techniques, New Age International (P) Limited, New Delhi.

**Supplementary:**

1. Gosh, B. N., (2007), Scientific Methods and Social Research, Sterling Publishers Private Limited., New Delhi
2. Mahmood, A., (2009): Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi.
3. Saravanavel, P., (2014), Research Methodology, Kitab Mahal, New Delhi
4. Singh, Gopal, (2010 ) Map Work and Practical Geography, Vikas Publishing House, New Delhi

**Web-based:**

1. <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1025&context=geographyfacpub>
2. [https://shodhganga.inflibnet.ac.in/bitstream/10603/168485/15/15\\_chapter%207.pdf](https://shodhganga.inflibnet.ac.in/bitstream/10603/168485/15/15_chapter%207.pdf)
3. <https://europepmc.org/backend/ptpmcrender.fcgi?accid=PMC1491888&blobtype=pdf>
4. <https://www.analyticsvidhya.com/blog/2020/04/excel-tips-tricks-data-analysis/>
5. <https://www.excel-easy.com/data-analysis.html>
6. <https://people.umass.edu/evagold/excel.html>
7. <http://data-analysis-reports.blogspot.com/2020/03/945108-anilgiri702-do-data-analysis-forecasting-compilation-reports-with-ms-excel.html>



**ELECTIVE****Course Title: Field Survey in Physical Geography (Theory)****Course Code: GEG- E2****Marks: 75****Credits: 3****Duration: 45 lectures of 1 hour each****Prerequisite Courses: Nil****Course Objectives:**

1. The primary aim of this Course to introduce various surveying instrument used in Physical Geography.
2. Students will learn the operation and the application of the instruments and methods of surveying.

**Course Outcomes:** At the end of this course, students will be able to:**CO1:** Understand functions and applications of dumpy level, Plane table and Global Positioning Systems (GPS) in field based studies.**CO2:** Independently handle survey instruments and prepare maps and field reports.**CO3:** Have hands-on training on using survey instruments in final year project work**CO4:** Detect the change in the spatial extension of area, locality and region.

Unit.	Topic	No. of hours	Marks
I	Significance and Methods of Survey; Classification of Surveying; Fundamentals of Plane Table and Prismatic Compass Survey: a) Radiation Method b) Intersection Method Pre survey work: Safety Measures, Field Book Preparation Post field survey work Report Writing.	15	25
II	Dumpy level surveying : meaning, functioning elements, applications and Methods: Rise-fall and Collimation method Pre survey and Post survey tasks.	15	25
III	GPS survey: Meaning, Space Segment, Ground Segment and GPS Receivers, Applications.	15	25
		45	75

**References:****Mandatory:**

1. Khullar, D.R. (2007), Essentials of Practical Geography, New Academic Publishing
2. Monkhouse, I.J. and Wilkinson, H.R. (2009), Maps and Diagram, B.I. Publication, New Delhi
3. Sarkar, Ashis (2000), Practical Geography: A Systematic Approach, Orient Longman Pvt. Ltd., Kolkata

**Supplementary:**

1. Campbell, J. (2004), Introductory Cartography, Prentice Hall, Inc Englewood
2. Co.,Jalandher

3. Misra, R.P. and Ramesh, A. (2005), Fundamentals of Cartography, Concept Pub. Co., New Delhi
4. Singh, R.L. and Singh Rana P.B.(2008), Elements of Practical Geography, Kalyani Publishers, New Delhi

**Web-based:**

1. <https://explorable.com/types-of-survey>
2. <https://www.slideshare.net/gauravhtandon1/plane-table-survey-27614680>
3. <https://libguides.usc.edu/writingguide/fieldreport>
4. <https://theconstructor.org/surveying/dumpy-level-surveying-components-procedure-advantages/20456/>
5. <https://www.gps.gov/systems/gps/>

**ELECTIVE****Course Title: Field Survey in Physical Geography (Practical)****Course Code: GEG-E2****Marks: 25****Credits:1****Duration: 15 Sessions of 2 hours each**  
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Unit	Topic	Practical sessions	Marks
I	Plane table and Prismatic Compass Survey: a) Radiation Method :1 Exercises b) Intersection Method: 1 Exercises	07	10
II	Dumpy Level Survey: Rise-Fall GPS Survey: Use of GPS in Mapping And Location Observation Of Slope, River and Coastal Morphology on Field	08	10
III	Journal /Field report		5
		15	25

**References:****Mandatory:**

1. Khullar, D.R. (2007), Essentials of Practical Geography, New Academic Publishing
2. Monkhouse, I.J. and Wilkinson, H.R. (2009), Maps and Diagram, B.I. Publication, New Delhi
3. Sarkar, Ashis (2000), Practical Geography: A Systematic Approach, Orient Longman Pvt. Ltd., Kolkata

**Supplementary:**

1. Campbell J. (2004), Introductory Cartography, Printice Hall, Inc Englewood
2. Misra, R.P. and Ramesh, A. (2005), Fundamentals of Cartography, Concept Pub. Co., New Delhi
3. Singh, R.L. and Singh Rana P.B.(2008), Elements of Practical Geography, Kalyani Publishers, New Delhi

**Web-based:**

1. <https://explorable.com/types-of-survey>
2. <https://www.slideshare.net/gauravhtandon1/plane-table-survey-27614680>
3. <https://libguides.usc.edu/writingguide/fieldreport>
4. <https://theconstructor.org/surveying/dumpy-level-surveying-components-procedure-advantages/20456/>
5. <https://www.gps.gov/systems/gps/>

**ELECTIVE****Course Title: Participatory Rapid Appraisal Techniques (Theory)****Course Code: GEG-E3****Marks: 75****Credits: 3****Duration: 45 lectures of 1 hour each****Prerequisite Courses: Nil****Course Objectives:**

1. To introduce the basics of Participatory Rapid Appraisal techniques in geographical studies.
2. This will facilitate students in their field work and further research.

**Course Outcomes:** At the end of this course, students will be able to:**CO1:** Be familiar with the basic concepts of PRA techniques**CO2:** Develop the skill to prepare questionnaires and Schedules for different PRA techniques.**CO3:** Understand the application of PRA techniques in geographical studies**CO4:** Accurately analyze and interpret the data collected using PRA techniques

Unit	Topic	No. of hours	Marks
I	PRA :Meaning Nature and Scope, evolution <b>Principles of Participatory Rapid Appraisal</b> -Offsetting biases, Rapid and Progressive Learning, Reversal of Roles, Focused Learning, Seeking for Diversity and Differences, Crosscheck by using different methods (Triangulation).	15	15
II	<b>Mapping Models:</b> Creating a Community Inventory Focus Group Discussions Matrix Ranking and Scoring Wealth Ranking Trend Analysis Timeline Venn diagrams Traditional management systems and local-resource collections Folklore, Songs, Poetry, And Dance	20	25
III	<b>PRA techniques:</b> Transect walks and guided field walks, Daily-activity profiles, Semi structured interviewing, Field report writing: techniques and structure.	10	35
		45	75

**References:****Mandatory:**

1. Mukherjee A, Chambers R,( 2004), Participatory Rural Appraisal: Methods and Applications in Rural Planning, Concept Publishing Company, New Delhi
2. Narayanaswamy, N., (2008), Participatory Rural Appraisal: Principles, Methods and Application, SAGE publications, New Delhi

**Supplementary:**

1. Bartle Phil, (2003), Methods of Participatory Appraisal, CSMED
2. Mikkelsen Britha, (2005), Methods for Development Work and Research: A New Guide for Practitioners, SAGE publications, New Delhi
3. Pokharel Ridish, Balla Mohan, (2003), A Process for Participatory Rural Appraisal, Institute of Forestry, Pokhar.

**Web-based:**

1. <http://www.fao.org/3/i2495e/i2495e06.pdf>
2. <https://www.participatorymethods.org/resource/participatory-rapid-appraisal-community-development-training-manual-based-experiences>
3. <https://www.nccmt.ca/knowledge-repositories/search/289>
4. <https://www.crs.org/sites/default/files/tools-research/rapid-rural-appraisal-and-participatory-rural-appraisal.pdf>
5. [https://getd.libs.uga.edu/pdfs/wolfgang\\_stephanie\\_1\\_201205\\_mla.pdf](https://getd.libs.uga.edu/pdfs/wolfgang_stephanie_1_201205_mla.pdf)

**ELECTIVE****Course Title: Participatory Rapid Appraisal Techniques (Practical)****Course Code: GEG-E3****Marks: 25****Credits: 1****Duration: 15 Sessions of 2 hours each**

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Unit	Topic	Practical Sessions	Marks
I	Exercise 1. Preparing a field Plan Exercise 2. Preparation of time scale. Exercise 3. Social mapping chart. Exercise 4. Semi-structured interview. Exercise 5. Timeline	07	10
II	Exercise 6. Time chart Exercise 7. Wealth ranking. Exercise 8. Venn diagram preparation. Exercise 9. Daily activity profiling.	08	10
III	Journal / Viva voce		05
		15	25

**Note: This practical is based on field work****References:****Mandatory:**

1. Mukherjee A, Chambers R, (2004), Participatory Rural Appraisal: Methods and Applications in Rural Planning, Concept Publishing Company, New Delhi
2. Narayanasamy. N, (2008), Participatory Rural Appraisal: Principles, Methods and Application, SAGE publications New Delhi

**Supplementary:**

1. Bartle Phil, (2003), Methods of Participatory Appraisal, CSMED
2. Mikkelsen Britha, (2005), Methods for Development Work and Research: A New Guide for Practitioners, SAGE publications, New Delhi
3. Pokharel Ridish, Balla Mohan, (2003), A Process for Participatory Rural Appraisal, Institute of Forestry, Pokhar.

**Web-based:**

1. <http://www.fao.org/3/i2495e/i2495e06.pdf>
2. <https://www.participatorymethods.org/resource/participatory-rapid-appraisal-community-development-training-manual-based-experiences>
3. <https://www.nccmt.ca/knowledge-repositories/search/289>
4. <https://www.crs.org/sites/default/files/tools-research/rapid-rural-appraisal-and-participatory-rural-appraisal.pdf>
5. [https://getd.libs.uga.edu/pdfs/wolfgang\\_stephanie\\_1\\_201205\\_mla.pdf](https://getd.libs.uga.edu/pdfs/wolfgang_stephanie_1_201205_mla.pdf)

**ELECTIVE****Course Title: Application of Computer in Geography (Theory)****Course Code: GEG-E4****Marks: 75****Credits: 3****Duration: 45 lectures of 1 hour each****Prerequisite Courses: Nil****Course Objectives:**

1. The course in application of computer in geography will enable student to use basic computer skills in geography to represent dimensional cartograms and data models.

**Course Outcomes:** At the end of this course, students will be able to:**CO1:** Understand functioning of different e-sources of geographical data**CO2:** Understand and its binary coding**CO3:** Prepare cartograms that can be used for various geographical applications using computers**CO4:** Represent geo-data using excel**CO5:** Identify and apply appropriate cartograms for given data set

Unit	Topic	No. of hours	Marks
I	Application of computers in cartography, E sources of geographical data. (e.g. Census ,Bhuvan, IMD, Easy tide, India Water Portal, portal of rural data)	15	15
II	Representation of Geographic data using computer: Cartograms of one, two and three dimensions, (Graphical Representation-Histogram, Bar Graphs, Line Graphs, Multiple Line Graphs, Scatter Diagrams, Pie Diagrams, Frequency polygon, Frequency curve, Cumulative frequency curve or Ogive	20	25
III	Geographic data and GIS: Fundamentals of raster and vector data models.(sources of data)	10	35
		45	75

**References:****Mandatory:**

1. Wilbanks. J, Thomas. (2004). Geography and Technology. Pg: 3-16. 10.1007/978-1-4020-2353-8\_1.

**Supplementary:**

1. Brunn Stanley, Cutter L. Susan, Harrington. J.W,(2004), Geography and Technology, Published by Kluwer Academic Publishers, P.O.Box 17, 3300 AA Dordrecht, The Netherlands.
2. Demers N. Michael, (2008), Fundamentals of Geographic Information systems, Published by Wiley India Pvt Ltd

3. Khullar, D.R. (2007), Essentials of Practical Geography, New Academic Publishing Co.,Jalandher
4. Robinson, A.H., et al: (2000)Elements of Cartography, John Wiley & Sons, New York
5. Sarkar Ashis, (2015), Practical Geography: A systematic Approach, Published by Orient Blackswan Pvt. Ltd., Telangana
6. Sui, Daniel & Morrill, Richard. (2004). Chapter 5 Computers And Geography: From Automated Geography To Digital Earth. 123-123. 10.1007/978-1-4020-2353-8\_5.

**Web-based:**

1. <https://www.loc.gov/rr/geogmap/guide/gmilldma.html>
2. <https://censusindia.gov.in/>
3. [http://mowr.gov.in/sites/default/files/AR2015-16\\_2.pdf](http://mowr.gov.in/sites/default/files/AR2015-16_2.pdf)
4. <https://mausam.imd.gov.in/>
5. <http://eagri.org/eagri50/STAM101/pdf/lec03.pdf>
6. <https://www.easybiologyclass.com/graphical-representation-of-data-frequency-polygon-frequency-curve-ogive-and-pie-diagram/>
7. [http://www.geo.umass.edu/courses/geo494a/Chapter2\\_GIS\\_Fundamentals.pdf](http://www.geo.umass.edu/courses/geo494a/Chapter2_GIS_Fundamentals.pdf)



**ELECTIVE****Course Title: Application of Computer in Geography (Practical)****Course Code: GEG-E4****Marks: 25****Credits: 1****Duration: 15 Sessions of 2 hours each**

Unit	Topic	Practical Sessions	Marks
I	Use of computer application in thematic mapping – Map Layouts, choropleth, dot density Cartograms of one, two and three dimensions, One dimensional plot: The Dot plot, Box and Whisker Plot	08	06
II	Two and Three dimensional: Histogram, Frequency Polygon, Cumulative frequency curve or Ogive (Graphical Representation-Histogram, Bar Graphs, Line Graphs, Multiple Line Graphs, Pie Diagrams, Frequency polygon, Frequency curve, Cumulative frequency curve or Ogive with the help of computers) Representation of point, line and polygon	09	14
IV	Journal		05
		15	25

**References:****Mandatory:**

1. Wilbanks. J, Thomas. (2004). Geography and Technology. Pg: 3-16. 10.1007/978-1-4020-2353-8\_1.

**Supplementary:**

1. Brunn Stanley, Cutter L. Susan, Harrington. J.W,(2004), Geography and Technology, Published by Kluwer Academic Publishers, P.O.Box 17, 3300 AA Dordrecht, The Netherlands.
2. Demers N. Michael, (2008), Fundamentals of Geographic Information systems, Published by Wiley India Pvt Ltd
3. Khullar.D.R. (2007), Essentials of Practical Geography, New Academic Publishing Co.,Jalandher
4. Robinson, A.H., et al: (2000)Elements of Cartography, John Wiley & Sons, New York
5. Sarkar Ashis, (2015), Practical Geography: A systematic Approach, Published by Orient BlackswanPvt.Ltd., Telangana
6. Sui, Daniel & Morrill, Richard. (2004). Chapter 5 Computers And Geography: From Automated Geography To Digital Earth. 123-123. 10.1007/978-1-4020-2353-8\_5.

**Web Based:**

1. [https://www.researchgate.net/publication/280112742\\_CHAPTER\\_5\\_COMPUTERS\\_AND\\_GEOGRAPHY\\_FROM\\_AUTOMATED\\_GEOGRAPHY\\_TO\\_DIGITAL\\_EARTH](https://www.researchgate.net/publication/280112742_CHAPTER_5_COMPUTERS_AND_GEOGRAPHY_FROM_AUTOMATED_GEOGRAPHY_TO_DIGITAL_EARTH)
2. <https://www.gislounge.com/whats-in-a-map/>
3. <https://datavizcatalogue.com/methods/choropleth.html>
4. <https://www.axismaps.com/guide/univariate/dot-density/>
5. <http://egyankosh.ac.in/bitstream/123456789/20422/1/Unit-14.pdf>
6. <https://www.statisticshowto.com/ogive-graph/>
7. <https://www.easybiologyclass.com/graphical-representation-of-data-frequency-polygon-frequency-curve-ogive-and-pie-diagram/>
8. <https://www.mathsisfun.com/data/data-graph.php>
9. <https://www.igismap.com/gis-tutorial-basic-spatial-elements-points-lines-and-polygons/>

**Semester IV**  
**Updated On 16<sup>th</sup> March 2020**

**CORE**

**Course Title: Basics of Geomorphology (Theory)**

**Course Code: GEG-IV.C6**

**Marks: 75**

**Credits: 3**

**Duration: 45 lectures of 1 hour each**

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**Prerequisite Courses: Nil**

**Course objectives:**

1. To provide the basic concepts, theories and application in geomorphology

**Course outcomes:**

At the end of this course, students will be able to:

**CO1:** Understand basic concepts of Geomorphology.

**CO2:** Understand theories of continental drifts, Isostasy sea floor spreading,

**CO3:** Analyze different types of slopes using contouring method.

**CO4:** Identify and distinguish geomorphic processes and landforms created by winds, underground water.

**CO5:** Analyze river basin based on morphometric parameters.

Identify and independently interpret relief features and their associations on SOI toposheets.

Unit	Topic	No. of hours	Marks
I	• Fundamental concepts in geomorphology- detail study of all nine fundamental concepts and their relevance in understanding Geomorphological processes.	15	25
II	Selected Theories in geomorphology • Tetrahedral theory. • Plate tectonics and mountain building. • Theories of slope development. • Slope- their stability and failures. • Drainage systems and patterns.	15	25
III	Agents, processes and landforms: erosional, transportation and depositional. • Fluvial landforms • Glacial landforms	15	25
		45	75

**References:****Mandatory:**

1. Singh, S. 2005 : Geomorphology, PrayagPustakBhawan, Allahabad
2. Thornbury, W.D., 2001: Principles of Geomorphology, 2nd Ed., Wiley International Edition, Wiley Eastern Reprint,
3. Sharma, H.S. (ed), 2002: Perspective in Geomorphology, Vol. I & IV, Concept, New Delhi
4. Wooldridge, S.W. and Morgan, R.S., 2000: The Physical Basis of Geography, Longman.
5. Sparks, B.W., 2000: Geomorphology, Longman, London

**Supplementary:**

1. Ahmed, E., 2005: Geomorphology, Kalyani Publishers, New Delhi
2. Bloom, Arthur L., 2004: Geomorphology – A Systematic Analysis of Late Cenozoic Landforms, Prentice Hall, Engle Wood Cliff, N.J
3. Chorley, Richard J., 2002: Spatial Analysis in Geomorphology, Harper and Row Publishers, New York, London.
4. Dayal, P. (2nd edition) 2006: A Textbook of Geomorphology, Shukla Book Depot, Patna
5. Sharma, V.K., 2006: Geomorphology, Earth Surface Processes and Forms, Tata Mc. Graw Hill, New Delhi.
6. Sharma, V.K., 2006: Geomorphology, Earth Surface, Process and forms, Tata McGraw Hill, New York
7. Strahler, A.N. 2006: Physical Geography, 3rd Ed., Wiley
8. Worcestor, P.G., 2005: A Textbook of Geomorphology, Van Nostrand, 2nd Ed., East West Edition, New Delhi.

**Web-Based:**

1. <http://shaileshchaure.com/Notes/GEOMCON.pdf>
2. <https://www.kean.edu/~csmart/Observing/05.%20Plate%20tectonics.pdf>
3. [https://www.researchgate.net/publication/272510857\\_Main\\_Drainage\\_Systems](https://www.researchgate.net/publication/272510857_Main_Drainage_Systems)
4. [https://www.researchgate.net/publication/309630899\\_FLUVIAL\\_PROCESSES\\_AND\\_LANDFORMS](https://www.researchgate.net/publication/309630899_FLUVIAL_PROCESSES_AND_LANDFORMS)
5. <https://people.wou.edu/~taylors/g322/glacial.pdf>

**CORE****Course Title: Basics of Geomorphology (Practical)****Course Code: GEG-IV.C6****Marks: 25****Credits: 1****Duration: 15 sessions of 2 hours each**

Unit	Title	Practical sessions	Marks
I	Slope analysis – Aspect map and Isotop map Identification of river patterns from SOI toposheet and Satellite Image	6	10
II	Preparation and interpretation of drainage map using SOI toposheet (at least one for humid/tropical and arid/dry region)	9	10
III	Journal and Viva		05
		15	25

**References:****Mandatory:**

1. Sarkar, Ashis, 2000: Practical Geography: A Systematic Approach, Orient Longman Pvt. Ltd., Kolkata.
2. Kale V.S. and Gupta Avijit (2000): Introduction to Geomorphology, Orient Black Swan Publications
3. Monkhouse, F.J. and Wilkinson, H.R., 2009: Maps and Diagrams, B.I. Publications Pvt. Ltd., New Delhi
4. Singh, R.L. and Singh Rana P.B., 2008, Elements of Practical Geography, Kalyani Publishers, New Delhi
5. Singh, Savindra (2006): Geomorphology, PrayagPustakBhavan, Allahabad

**Supplementary**

1. Chorley, Richard. J. (ed.), 2001: Water, Earth and Man, Methuen & Co., London
2. Goudie, Andrew, et al. (eds), 2001: Geomorphological Technique, George Allen & Unwin, London
3. Gregory, K.J. and Walling, D.E., 2003: Drainage Basin – Form and Process, Edward Arnold, London
4. King, C.A.M., 2006: Techniques in Geomorphology, Edward Arnold, London
5. Leopold, L.B., Wolman, M.G. and Miller, J.P., 2004: Fluvial Processes in Geomorphology, Freeman, San Francisco
6. Misra, R.P. and Ramesh, A., 2009: Fundamentals of Cartography, Concept Publishing Co., New Delhi
7. Strahler, A.N., 2000: Physical Geography, 3rd Ed., Wiley.

**Web-Based:**

1. <https://shodhganga.inflibnet.ac.in/bitstream/10603/160201/3/chapter%204.pdf>
2. <http://www.wvca.us/envirothon/pdf/Drainage%20Patterns.pdf>
3. [https://www.soilandwater.nyc/uploads/7/7/6/5/7765286/watershed\\_delineation.pdf](https://www.soilandwater.nyc/uploads/7/7/6/5/7765286/watershed_delineation.pdf)
4. <https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/water/manage/?cid=stelprd1046651>
5. <http://www.ncert.nic.in/ncerts/l/iess103.pdf>

**ELECTIVE****Course Title: Basics of Climatology (Theory)****Course Code: GEG-E5****Marks: 75****Credits: 3****Duration: 45 lectures of 1 hour each**  
=====**Prerequisite Courses:** Nil**Course Objective:**

1. To introduce key concepts of climatology in general and Indian monsoon in details

**Course Outcomes:**

At the end of this course, students will be able to:

**CO1:** Understand and analyze the concepts in atmospheric stability.**CO2:** Distinguish different mechanisms of Indian monsoon.**CO3:** Associate the indicators of changing climate to the day to day weather dynamics.**CO4:** Apply climatic concepts in issues related to agriculture, health and disasters.**CO5:** Represent weather phenomenon using weather station model.**CO6:** Have hands on experience of handling weather instruments, calibrating, reading, interpretation and forecasting.

Unit	Title	No. of hours	Marks
I	<b>Fundamental of Atmospheric circulation</b> Atmospheric Stability. Cloud Development and Stability. Clouds seeding and artificial rain, Atmospheric Disturbance, Air Masses and its types. Fronts and types. Tropical and temperate Cyclones. El-nino and la-nina.	15	25
II	<b>Indian Climatology:</b> <b>Pre monsoon:</b> Cyclonic storms, frequency, cyclone genesis, intensity, landfall and associated weather.	15	25
III	<b>Indian Climatology:</b> <b>South West monsoon :</b> onset and advance of southwest monsoon, links to El Nino/Southern Oscillation, Indian Ocean Dipole and Madden Julian Oscillation Index. <b>Post monsoon:</b> withdrawal of southwest monsoon, Northeast monsoon, cyclonic storms in the Indian seas, trends in cyclonic disturbances, western disturbances, Easterly waves..	15	25
		45	75

**References:****Mandatory:**

1. Lal, D.S., 2011: Climatology, ShardaPustakBhavan
2. Monkhouse, F.J., 1975 – Principles of Physical Geography , Hodder Murray Publishers
3. Barry R.G. and Chorley, R. J., 2009: Atmosphere, Weather and Climate, Routledge
4. Tikka - R.N., 1998 - Physical Geography. KedarNath Ram Nath, Meerut
5. Trewartha, G.T., 1968: Introduction to Climate, McGraw-Hill

**Supplementary:**

1. Bunnett R.B. , 1993: Physical geography in Diagrams, Longman
2. Critchfield, H.J, 1998 : General Climatology, Prentice-Hall
3. P. Birot, 1966: General Physical Geography, Longman, Green & Co Strahler, A.H., 1983: Modern Physical Geography, John Wiley and Sons
4. Strahler A. M. and Strahler A.H., 1983: Elements of Physical Geography, John Wiley and Sons
5. Stringer, E.T., 1972: Foundation of Climatology: An Introduction to Physical, Dynamic, Synoptic, and Geographical Climatology, W.H. Freeman & Co. Ltd.

**Web-Based:**

1. <https://www.ess.uci.edu/~yu/class/ess5/Chapter.9.airmass.all.pdf>
2. [https://www.weather.gov/media/owlie/2018\\_ENSO.pdf](https://www.weather.gov/media/owlie/2018_ENSO.pdf)
3. [http://www.wmo.int/pages/prog/wcp/wcasp/documents/JN142122\\_WMO1145\\_EN\\_web.pdf](http://www.wmo.int/pages/prog/wcp/wcasp/documents/JN142122_WMO1145_EN_web.pdf)
4. <http://www.fao.org/3/ca3758en/ca3758en.pdf>
5. <https://www.ias.ac.in/article/fulltext/reso/012/05/0004-0020>

**ELECTIVE****Course Title: Basics of Climatology (Practical)****Course Code: GEG-E5****Marks: 25****Credits: 1****Duration: 15 sessions of 2 hours each**  
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Unit	Title	Practical sessions	Marks
I	Representation and interpretation of weather phenomena using isolines Isohyets map Isotherm map Isobars Wind rose and their types Evapotranspiration(Annual variability) Preparation of weather Station Model.	05	8
II	<ul style="list-style-type: none"><li>• Study of weather symbols and IMD weather charts. Interpretation of IMD weather charts (at least 1 map of three seasons)</li><li>• Visit to IMD for hands- on- training: handling of weather instruments, taking readings, temperature, pressure, sunshine chart interpretation and forecasting</li></ul>	2 + 8=10	12
III	Journal		5
		15	25

**References****Mandatory:**

1. Misra, R.P. and Ramesh, A., 2009: Fundamentals of Cartography, Concept Publishing Co., New Delhi
2. Singh, R.L., 2000: Elements of Practical Geography, Kalyani Publishers, New Delhi
3. Singh, R ; Singh L.R., 2001: Mapworks in Practical Geography, Central book Depot, Allahabad
4. Bygot, J., 2001: An Introduction to Map Work and Practical Geography
5. Campbell, J., 2004: Introductory Cartography, Prentice Hall, Inc Englewood

**Supplementary**

1. Chorley, Richard. J. (ed.), 2001: Water, Earth and Man, Methuen & Co., London
2. Monkhouse, F.J. and Wilkinson, H.R., 2009: Maps and Diagrams, B.I. Publications Pvt. Ltd., New Delhi
3. Raisz, E., 2005: General Cartography, McGraw Hills Co., London
4. Robinson, A.H., et al, 2003: Elements of Cartography, John Wiley and Sons, New York



**Web-Based:**

1. <https://www.ntschoools.org/cms/lib/NY19000908/Centricity/Domain/112/Drawing%20Isotherms.Isobars.pdf>
2. <http://www.huskersk12.org/vimages/shared/vnews/stories/521b6ab5ac56b/isobarandisothermmmaplab.pdf>
3. [https://www.lakeheadu.ca/sites/default/files/uploads/53/outlines/2017-18/GEOG2331/2331\\_Manual\\_W18\\_forStudents.pdf](https://www.lakeheadu.ca/sites/default/files/uploads/53/outlines/2017-18/GEOG2331/2331_Manual_W18_forStudents.pdf)
4. <http://ncert.nic.in/textbook/pdf/kegy308.pdf>
5. [https://www.imdtvm.gov.in/index.php?option=com\\_content&task=view&id=21&Itemid=35](https://www.imdtvm.gov.in/index.php?option=com_content&task=view&id=21&Itemid=35)

**ELECTIVE****Course Title: Basics of Oceanography (Theory)****Course Code: GEG- E6****Marks: 75****Credits: 3****Duration: 45 lectures of 1 hour each****Prerequisite Courses: Nil****Course Objective:**

1. To provide the basic conceptual framework of oceanography, its dynamism and the contemporary issues associated with Oceans.

**Course outcomes:**

At the end of this course, students will be able to:

- CO1:** Develop an understanding of the ocean bottom relief features of Indian, Atlantic and Pacific ocean
- CO2:** Understand and test the physical properties of ocean water using scientific instruments.
- CO3:** Understanding the types of marine deposition and its relation with man
- CO4:** Read and interpret bathymetric and hydrographic charts
- CO5:** Prepare bathymetric chart using interpolation method.

Unit	Title	No. of hours	Marks
I	<b>Comparative Study of bottom relief of Indian, Atlantic and pacific ocean</b> <b>Properties of ocean water-</b> Salinity, Temperature, Density and relation among them.	15	25
II	<b>Dynamics of ocean water:</b> -Waves, Tides, and surface currents of Indian and Atlantic Ocean.	15	25
III	<b>Marine Deposits:</b> Classification and sources <b>Man and marine resources</b>	15	25
		45	75

**References****Mandatory:**

1. K. Siddhartha Oceanography, 2000: A Brief Introduction, Kislaya publishers
2. Defant, A., 2001: Physical Oceanography, Vol. I, Pergamon Press
3. Gautam, Alka. 2004. Climatology and Oceanography. Rastogi Publication-Meerut, UP.
4. Sharma R. C. and Vatal M., 2003: Oceanography for Geographers, Chaitanya Publishing House, Allahabad.
5. Lal, D.S., 2003: Oceanography, ShardaPustakBhavan, Allahabad

**Supplementary:**

1. Singh, S. 2005 : Geomorphology, PrayagPustakBhawan, Allahabad
2. Ahmed, E., 2005: Geomorphology, Kalyani Publishers, New Delhi
3. Bloom, Arthur L., 2004: Geomorphology – A Systematic Analysis of Late Cenozoic Landforms, Prentice Hall, Engle Wood Cliff, N.J
4. Kale V.S. and Gupta Avijit (2000): Introduction to Geomorphology, Orient Black Swan Publications
5. Strahler, A.N., 2000: Physical Geography, 3rd Ed., Wiley

**Web-Based:**

1. [https://sweethaven02.com/PDF\\_Lifelong/Oceanography.pdf](https://sweethaven02.com/PDF_Lifelong/Oceanography.pdf)
2. [http://msi.ttu.ee/~elken/IntroOcean\\_Tomczak.pdf](http://msi.ttu.ee/~elken/IntroOcean_Tomczak.pdf)
3. <http://www.geographynotes.com/oceanography/bottom-reliefs-of-various-oceans-oceanography-geography/2592>
4. <https://www.mt-oceanography.info/regoc/pdffiles/colour/single/14P-Atlantic.pdf>
5. [https://www.researchgate.net/publication/315191645\\_Marine\\_Sediments](https://www.researchgate.net/publication/315191645_Marine_Sediments)

**ELECTIVE****Course Title: Basics of Oceanography (Practical)****Course Code: GEG- E6****Marks: 25****Credits: 1****Duration: 15 sessions of 2 hours each**

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Unit	Title	Practical sessions	Marks
I	Signs and symbols in hydrographic charts and reading of hydrographic chart. Reading of Bathymetric chart Plotting of Bathymetric and Hypsometric curves.	10	15
II	Water analysis – salinity, PH, Conductivity and TDS	05	05
III	Journal and Viva		05
		15	25

**References:****Mandatory:**

1. Misra, R.P. and Ramesh, A., 2005: Fundamentals of Cartography, Concept Pub. Co., New Delhi
2. Singh, R.L., 2000: Elements of Practical Geography, Kalyani Publishers, New Delhi
3. Singh, R ; Singh L.R., 2001: Mapworks in Practical Geography, Central book Depot, Allahabad
4. Sarkar, Ashis, 2000: Practical Geography: A Systematic Approach, Orient Longman Pvt. Ltd., Kolkata.
5. Khullar, D. R. (2000: Essentials Of Practical Geography, New Academic Publishing Co., Jalandar

**Supplementary**

1. Bygot, J., 2001: An Introduction to Map Work and Practical Geography
2. Campbell, J., 2004: Introductory Cartography, Prentice Hall, Inc Englewood
3. Jackson, R.H. and Hudmar, L.E., 2001: Regional Geography: Issues for today
4. Monkhouse, I.J. and Wilkinson, H.R., 2001: Maps and Diagram, B.I. Publication, New Delhi
5. Raisz, E., 2005: General Cartography, McGraw Hills Co., London
6. Robinson, A.H., et al, 2003: Elements of Cartography, John Wiley and Sons, New York

**Web-based:**

1. [https://www.researchgate.net/publication/281410339\\_Bathymetry\\_History\\_of\\_Seafloor\\_Mapping](https://www.researchgate.net/publication/281410339_Bathymetry_History_of_Seafloor_Mapping)
2. [http://aquaticcommons.org/14702/4/nycmsp\\_ch2\\_bathymetry.pdf](http://aquaticcommons.org/14702/4/nycmsp_ch2_bathymetry.pdf)
3. <https://pubs.usgs.gov/of/2015/1180/ofr20151180.pdf>
4. [http://www.scpscience.com/Company%20Literature/Pdf/Catalogs/wateranalysis%20vol2\(Oct%207\).pdf](http://www.scpscience.com/Company%20Literature/Pdf/Catalogs/wateranalysis%20vol2(Oct%207).pdf)
5. [https://www.who.int/water\\_sanitation\\_health/dwq/2edvol3d.pdf](https://www.who.int/water_sanitation_health/dwq/2edvol3d.pdf)

**ELECTIVE****Course Title: Regional Geography of India (Theory)****Course Code: GEG-E7****Marks: 75****Credits: 3****Duration: 45 lectures of 1 hour each****Pre-requisite Courses: Nil****Course Objectives:**

1. The course is aimed at presenting an integrated and empirically based profile of India and Goa

**Course Outcomes:**

At the end of this course, students will be able to:

- CO1:** Have an understanding of the inter linkages and interaction between physical aspects and resource base of India and Goa
- CO2:** Learn the skills of choosing appropriate cartographic techniques to quantitatively represent regional aspects of India and Goa
- CO3:** Infer the processes that operate through space and time in different regions of India and Goa
- CO4:** Understand the recent development and changes in context of India.

Unit	Title	No. of hours	Marks
I	India: Location, Geology, Morphological divisions, Drainage System, Soil, Forest	15	25
II	Resource development: Indian Agriculture: New Technology Water Resource Development: multipurpose projects inland waterways plan. Industrialization : IT's, SEZ Trade and Transport: Golden Quadrangle, Konkan Railway	15	25
III	Goa: Location: Absolute and relative. Physiographic divisions, soils, vegetation, mineral resources, Mining and water resources, population, Tourism, Industrialization Trade, Transport and Communication	15	25
		45	75

**References:****Mandatory:**

1. Deshpande C.D, (1992): India-A Regional Interpretation Northern Book Centre, New Delhi
2. Khullar, D.R. (2011): "Indian-A Comprehensive Geography" Kalyani Publishers, New Delhi
3. Tiwari, R.C. (2006): "Geography of India" PrayagPustakBhavan, Allahabad.
4. Singh, R.L.(ed) (1971): India: A Regional Geography. National Geographical Society. India, Varnasi
5. Alvares Claude (2002), Fish, Curry and Rice: A Source Book on Goa, its Ecology and Lifestyle, The Goa Foundation, Goa

**Supplementary:**

1. Routray, J.K. (1993): Geography of Regional Disparity Asian Institute of technology, Bangkok
2. Learmonth, A.T.A. et.al (ed): Man and Land of South Asia Concept, New Delhi.
3. Shafi, M, (2000): Geography of South Asia, McMillan & Co., Calcutta
4. Spate, O.H.K. and Learmonth, A.T.A. (1967): India and Pakistan - Land, People and Economy Methuen & Co., London,
5. Valdiya, K.S. (1998): Dynamic Himalaya, University Press, Hyderabad
6. Valdiya, K.S. (2004): Geology, Environment and Society, University Press, Hyderabad
7. Wadia, D.N. (1967): Geology of India, McMillan & Co., London,

**Web-Based:**

1. [https://www.researchgate.net/publication/39728980\\_Agricultural\\_Development\\_in\\_India\\_since\\_Independence\\_A\\_Study\\_on\\_Progress\\_Performance\\_and\\_Determinants](https://www.researchgate.net/publication/39728980_Agricultural_Development_in_India_since_Independence_A_Study_on_Progress_Performance_and_Determinants)
2. <http://ncert.nic.in/ncerts/l/iess102.pdf>
3. [https://www.researchgate.net/publication/316644891\\_Physiographic\\_Divisions\\_of\\_India](https://www.researchgate.net/publication/316644891_Physiographic_Divisions_of_India)
4. [https://www.researchgate.net/publication/271829967\\_India's\\_Golden\\_Quadrilateral\\_A](https://www.researchgate.net/publication/271829967_India's_Golden_Quadrilateral_A)
5. [https://www.researchgate.net/publication/283721221\\_WESTERN\\_GHATS\\_OF\\_GOA\\_STATE\\_A\\_GEOGRAPHICAL\\_DIAGNOSIS](https://www.researchgate.net/publication/283721221_WESTERN_GHATS_OF_GOA_STATE_A_GEOGRAPHICAL_DIAGNOSIS)

**ELECTIVE****Course Title: Regional Geography of India (Practical)****Course Code: GEG-E7****Marks: 25****Credits: 1****Duration: 15 sessions of 2 hours each**

Unit	Title	Practical sessions	Marks
I	Cartographic representation and mapping of physiographic division, Soil, Forest, Climatic Division- examples of India and Goa	8	10
II	Calculation and graphical representation of—by using Goa's census data: Age-sex ratio, Child-women ratio, Dependency ratio, Infant mortality rate, Age specific mortality, Population growth rate, Population projection(as per 2001 and 2011 census) Preparation of choroschematic map of Goa	7	10
III	Journal and Viva		05
		15	25

**References:****Mandatory:**

1. Singh, R.L.: Elements of Practical Geography, Kalyani Publishers, New Delhi ,2000
2. Khullar, D.R. (2011): "Indian-A Comprehensive Geography" Kalyani Publishers, New Delhi
3. Monkhouse, I.J. and Wilkinson, H.R., 2001: Maps and Diagram, B.I. Publication, New Delhi
4. Singh, R ; Singh L.R., Mapworks in Practical Geography,Central book Depot, Allahabad,2001
5. Singh Gopal (2000), Map Work and Practical Geography, 4th Revised Edition, Vikas Publishing House Pvt. Ltd., New Delhi

**Supplementary:**

1. Bygot, J.: An Introduction to Map Work and Practical Geography,2001
2. Campbell, J., 2004: Introductory Cartography, Prentice Hall, Inc Englewood
3. Misra, R.P. and Ramesh, A., 2005: Fundamentals of Cartography, Concept Pub. Co., New Delhi
4. Raisz, E.: General Cartography, McGraw Hills Co., London ,2005
5. Robinson, A.H., et al.: Elements of Cartography, John Wiley and Sons, New York,2003
6. Jackson, R.H. and Hudmar, L.E.: Regional Geography: Issues for today ,2001
7. Tiwari, R.C. (2006): "Geography of India" PrayagPustakBhavan, Allahabad.
8. Valdiya, K.S. (2004): Geology, Environment and Society, University Press, Hyderabad

**Web-Based:**

1. <http://ncert.nic.in/ncerts/l/kegy106.pdf>
2. <http://fsi.nic.in/isfr-2015/isfr-2015-important-characteristics-of-indian-forest-types.pdf>
3. [http://censusindia.gov.in/Data\\_Products/Library/Provisional\\_Population\\_Total\\_link/PDF\\_Links/chapter6.pdf](http://censusindia.gov.in/Data_Products/Library/Provisional_Population_Total_link/PDF_Links/chapter6.pdf)
4. <https://www.demographic-research.org/volumes/vol4/8/4-8.pdf>
5. <https://www.ifo.de/DocDL/dicereport3-03-database-6.pdf>



**ELECTIVE****Course Title: Regional Geography of USA (Theory)****Course Code: GEG-E8****Marks: 75****Credits: 3****Duration: 45 lectures of 1 hour each**  
=====**Prerequisite Courses:** Nil**Course Objectives:**

1. This introductory Course is intended to acquaint the students with a systematic view of physical and socio-economic dimensions of the United States of America.

**Course Outcomes:**

At the end of this course, students will be able to:

**CO1:** Understand the physical landscape of USA.**CO2:** Understand the Socio-Cultural, Demographic, Political and Economic aspects of USA**CO3:** Infer the processes that operate through space and time in different regions of USA**CO4:** Understand the recent transnational developments in USA and their impacts on India

Unit	Title	No. of hours	Marks
I	Physical landscape: Tectonics, Mountains, Plateaus, Plains, Deserts, Islands. Climate Region. Rivers & Water Regimes. Wetlands. Plants Animal Ecology and Ecoregions. Human imprints on landscape and Environmental: management and conservation.	15	25
II	Socio-Cultural landscape: Demographic, Cultural, Political and Economic aspects. Socializing Economic Space: Culture and the Firm, Gender Economies, Ethnic Economies. Social issues and experience of living in America.	15	25
III	Determinants of Economic landscape: Incorporations and Government Transnational Corporations, Labour Power, Consumption Dynamic Economic Space: Economic Growth and development, commodity chain technology and agglomeration.	15	25
		45	75

**References:****Mandatory:**

1. Antony Orme (2002), Physical Geography of North America. Oxford University Press, New York

**Supplementary:**

1. Chris Mayda (2013), A Regional Geography of the United States and Canada: Toward a Sustainable Theme. Rowman and littlefields Pub. UK
2. John C. Hudson (2002), Across This Land: A Regional Geography of the United States and Canada. The John Hopkins University Press, USA

3. Neil Coe, Philip Kelly & Henry W. C. Yeung (2007), *Economic Geography: A Contemporary Introduction* (2ed), Blackwell Publishing, USA

**Web-based:**

1. <https://www.infoplease.com/encyclopedia/places/north-america/us/united-states/physical-geography>
2. <https://study.com/academy/lesson/overview-of-the-geography-of-the-united-states.html>
3. <https://www.worldtravelguide.net/guides/north-america/united-states-of-america/weather-climate-geography/>
4. <https://www.nps.gov/subjects/culturallandscapes/understand-cl.htm>
5. <https://www.canyonspringshighschool.org/ourpages/auto/2015/11/6/54748438/Geography%206.pdf>
6. <https://www.nederland.k12.tx.us/view/2819.pdf>

**ELECTIVE****Course Title: Regional Geography of USA (Practical)****Course Code: GEG-E8****Marks: 25****Credits: 01****Duration: 15 sessions of 2 hours each**  
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Unit	Title	Practical Sessions	Marks
I	Interpretation of USGS topographical Map, Indexing, Signs and symbols, colour schemes, Scales and Grids, projections Physical aspects: Relief, Drainage, Vegetation,	8	10
II	Interpretation of USGS topographical maps Cultural Aspects: Settlement, transport network, Landuse	7	10
III	Journal		5
		15	25

**References:****Mandatory:**

1. Nelson Petrie (2007) Analysis and Interpretation of Topographical Maps (Rev) (Getting Ahead in Social Science). Orient BlackSwan,
2. Terry Marsh (2007) Pathfinder Map Reading Skills: An Introduction to Map Reading and Basic Navigation (Pathfinder Guide) Jarrold Publishing.

**Supplementary:**

1. D.S. Bhattacharya and T.C. Bagchi (1973) Elements of Geological Map Reading and Interpretation (with exercises). Orient Black Swan
2. Geological Survey and Rand McNally (2003) National Geographic Arkansas: Seamless USGS Topographic Maps. National Geographic Society.
3. Gopal Singh Map Work and Practical Geography, 4/e. Vikas Publishing.
4. Jenny Marie Johnson (2003):Geographic Information, How to Find It, How to Use It. Greenwood Press, London.
5. John B. Rowland (1955) FEATURES SHOWN ON TOPOGRAPHIC MAPS. GEOLOGICAL SURVEY CIRCULAR 368, USGS, Washington DC.
6. Ordnance Survey (2002) Reading, Wokingham and Pangbourne (Explorer M... (Map), Ordnance Survey Southampton, UK.
7. Pentagon U.S. Military (1999) Map Reading and Land Navigation. Pentagon US.
8. Rachel Hewitt (2013) Map of a Nation: A Biography Of The Ordnance Survey. Granta Book.
9. Richard DE Bruin and W. Hilton Johnson American Educational 100 Topographic Maps. American Packing & Gasket
10. Robert B. Matkin (1992)Map Reading. Dalesman Publishing Co Ltd

**Web-based:**

1. Data Source: <http://www.map-reading.com/>
2. <https://pubs.usgs.gov/gip/TopographicMapSymbols/topomapsymbols.pdf>
3. <https://www.usgs.gov/science-support/osqi/yes/resources-teachers/interpreting-topographic-maps-and-aerial-photographs>
4. <https://www.honolulu.hawaii.edu/instruct/natsci/geology/brill2/TopoMaps.pdf>
5. <https://pubs.usgs.gov/circ/1955/0368/report.pdf>
6. <https://mapasyst.extension.org/topography-and-understanding-topographic-maps/>
7. <https://www.honolulu.hawaii.edu/instruct/natsci/geology/brill2/TopoMaps.pdf>

**Semester V**  
**Updated On 16<sup>th</sup> March 2020**

**CORE**

**Course Title: Geomorphology: Landforms and Processes (Theory)**

**Course Code: GEG-V.C7**

**Marks: 75**

**Credits: 3**

**Duration: 45 lectures of 1 hour each**

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**Prerequisite Courses:**

Nil

**Course objective:**

1. To provide the basic concepts, theories and applications in geomorphology

**Course outcomes:**

At the end of this course, students will be able to:

**CO1:** Understand the nine fundamental concepts of Geomorphology.

**CO2:** Understand theories of plate tectonics, mountain building, drainage systems and patterns.

**CO3:** Identify and distinguish geomorphic processes and landforms created by rivers.

**CO4:** Identify and distinguish geomorphic processes and landforms created by glaciers.

**CO5:** Prepare Slope map using aspect map and isotan map.

**CO6:** Independently prepare a drainage map.

Unit	Topic	No. of hours	Marks
I	<ul style="list-style-type: none"><li>• Meaning, Nature, Scope and significance of geomorphology</li><li>• Geological timescale.</li><li>• Continental Drift Theory</li><li>• Theory of Isostasy – Airy's &amp; Pratt.</li><li>• Concept of seafloor spreading.</li></ul>	15	25
II	<ul style="list-style-type: none"><li>• Vulcanicity and the related landforms</li><li>• Cycle of erosion – Davis and Penck</li><li>• Concept of rejuvenation.</li></ul>	15	25
III	<ul style="list-style-type: none"><li>• Geomorphic processes and landforms</li><li>• Study of Aeolian processes and the resultant landforms-erosional, transportational and depositional.</li><li>• Study of Karst processes and the resultant landforms-erosional, transportational and depositional.</li></ul>	15	25
		45	75

**References:****Mandatory:**

1. Singh, S. 2005 : Geomorphology, PrayagPustakBhawan, Allahabad
2. Thornbury, W.D., 2001: Principles of Geomorphology, 2nd Ed., Wiley International Edition, Wiley Eastern Reprint,
3. Sharma, H.S. (ed), 2002: Perspective in Geomorphology, Vol. I & IV, Concept, New Delhi
4. Wooldridge, S.W. and Morgan, R.S., 2000: The Physical Basis of Geography, Longman.
5. Sparks, B.W., 2000: Geomorphology, Longman, London

**Supplementary:**

1. Ahmed, E., 2005: Geomorphology, Kalyani Publishers, New Delhi
2. Bloom, Arthur L., 2004: Geomorphology – A Systematic Analysis of Late Cenozoic Landforms, Prentice Hall, Engle Wood Cliff, N.J
3. Chorley, Richard J., 2002: Spatial Analysis in Geomorphology, Harper and Row Publishers, New York, London.
4. Dayal, P. (2nd edition) 2006: A Textbook of Geomorphology, Shukla Book Depot, Patna
5. Sharma, V.K., 2006: Geomorphology, Earth Surface Processes and Forms, Tata Mc. Graw Hill, New Delhi.
6. Sharma, V.K., 2006: Geomorphology, Earth Surface, Process and forms, Tata McGraw Hill, New York
7. Strahler, A.N. 2006: Physical Geography, 3rd Ed., Wiley
8. Worcestor, P.G., 2005: A Textbook of Geomorphology, Van Nostrand, 2nd Ed., East West Edition, New Delhi.

**Web-Based:**

1. [http://www.geo.hunter.cuny.edu/~fbuon/GEOL\\_231/Lectures/Intro%20Basic%20Concepts.pdf](http://www.geo.hunter.cuny.edu/~fbuon/GEOL_231/Lectures/Intro%20Basic%20Concepts.pdf)
2. [https://courses.ess.washington.edu/ess-306/links/Goudie\\_Encyclopedia\\_of\\_Geomorphology.pdf](https://courses.ess.washington.edu/ess-306/links/Goudie_Encyclopedia_of_Geomorphology.pdf)
3. [https://bgc.org.in/pdf/OPEN-EDUCATIONAL-RESOURCES/GEOGRAPHY/Cycle-of-erosion\\_%20UG\\_I\\_AI\\_1.pdf](https://bgc.org.in/pdf/OPEN-EDUCATIONAL-RESOURCES/GEOGRAPHY/Cycle-of-erosion_%20UG_I_AI_1.pdf)
4. <https://www.slideshare.net/pramodgpramod/davis-cycle-of-erosion>
5. [https://www.researchgate.net/publication/314395551\\_Karst\\_Processes\\_and\\_Landforms](https://www.researchgate.net/publication/314395551_Karst_Processes_and_Landforms)

**CORE****Course Title: Geomorphology: Landforms and Processes (Practical)****Course Code: GEG-V.C7****Marks: 25****Credits: 1****Duration: 15 sessions of 2 hours each**

Unit	Topic	Practical Sessions	Marks
I	River morphometry Calculation of linear properties of river. Calculation of Aerial properties of river. Calculation of Relief properties of river.	6	10
II	Interpretation of 42 SOI toposheets- physical aspect (relief, vegetation, river)	9	15
III	Journal	15	25

**References:****Mandatory:**

1. Sarkar, Ashis, 2000: Practical Geography: A Systematic Approach, Orient Longman Pvt. Ltd., Kolkata.
2. Kale V.S. and Gupta Avijit (2000): Introduction to Geomorphology, Orient Black Swan Publications
3. Monkhouse, F.J. and Wilkinson, H.R., 2009: Maps and Diagrams, B.I. Publications Pvt. Ltd., New Delhi
4. Singh, R.L. and Singh Rana P.B., 2008, Elements of Practical Geography, Kalyani Publishers, New Delhi
5. Singh, Savindra (2006): Geomorphology, Prayag PustakBhavan, Allahabad

**Supplementary**

1. Chorley, Richard. J. (ed.), 2001: Water, Earth and Man, Methuen & Co., London
2. Goudie, Andrew, et al. (eds), 2001: Geomorphological Technique, George Allen & Unwin, London
3. Gregory, K.J. and Walling, D.E., 2003: Drainage Basin – Form and Process, Edward Arnold, London
4. King, C.A.M., 2006: Techniques in Geomorphology, Edward Arnold, London
5. Leopold, L.B, Wolman, M.G. and Miller, J.P., 2004: Fluvial Processes in Geomorphology, Freeman, San Francisco
6. Misra, R.P. and Ramesh, A., 2009: Fundamentals of Cartography, Concept Publishing Co., New Delhi
7. Strahler, A.N., 2000: Physical Geography, 3rd Ed., Wiley.

**Web-Based:**

1. [https://www.researchgate.net/publication/235990109\\_Morphometric\\_analysis\\_of\\_Morar\\_River\\_Basin\\_Madhya\\_Pradesh\\_India\\_using\\_remote\\_sensing\\_and\\_GIS\\_techniques](https://www.researchgate.net/publication/235990109_Morphometric_analysis_of_Morar_River_Basin_Madhya_Pradesh_India_using_remote_sensing_and_GIS_techniques)
2. <https://www.tandfonline.com/doi/full/10.1080/24749508.2018.1563750>
3. <http://ncert.nic.in/ncerts/l/kegy305.pdf>
4. [https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/earthsciences/pdf/topo101/pdf/mapping\\_basics\\_e.pdf](https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/earthsciences/pdf/topo101/pdf/mapping_basics_e.pdf)
5. [https://www.wvgs.wvnet.edu/www/maps/topomapsymbols\\_MapX1B.pdf](https://www.wvgs.wvnet.edu/www/maps/topomapsymbols_MapX1B.pdf)

**ELECTIVE****Course Title: Geography of Climate Change (Theory)****Course Code: GEG-E9****Marks: 75****Credits: 3****Duration: 45 lectures of 1 hour each**

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**Prerequisite Courses: Nil****Course Objective:**

1. To introduce key concepts of climatology in general and Indian monsoon in details.

**Course outcomes:**

At the end of this course, students will be able to:

**CO1:** Understand and analyze the concepts in urban climate.

**CO2:** Distinguish different mechanisms of city weather modifications.

**CO3:** Associate the indicators of changing climate to the day to day weather dynamics.

**CO4:** Apply climatic concepts in issues related to agriculture, health and disasters.

**CO5:** Understand the working of weather instruments

**CO6:** Set up, calibrate weather instruments, collect readings and interpret weather data

Unit	Title	No. of hours	Marks
I	Urban Climate – introduction, modification of atmospheric composition Modification of heat budget Modifications in city weather conditions	15	25
II	Changing climate – climate system Climate change detection Natural causes of climate change Human impact on global climate	15	25
III	Climate and its applications – agriculture, health and disaster reduction	15	25
		45	75

**References:****Mandatory:**

1. Lal, D.S., 2011: Climatology, ShardaPustakBhavan
2. Monkhouse, F.J., 1975 – Principles of Physical Geography , Hodder Murray Publishers
3. Barry R.G. and Chorley, R. J., 2009: Atmosphere, Weather and Climate, Routledge
4. Tikka - R.N., 1998 - Physical Geography. KedarNath Ram Nath, Meerut
5. Trewartha, G.T., 1968: Introduction to Climate, McGraw-Hill



**Supplementary:**

1. Bunnett R.B. , 1993: Physical geography in Diagrams, Longman
2. Critchfield, H.J, 1998 : General Climatology, Prentice-Hall
3. P. Birot, 1966: General Physical Geography, Longman, Green & Co Strahler, A.H., 1983: Modern Physical Geography, John Wiley and Sons
4. Strahler A. M. and Strahler A.H., 1983: Elements of Physical Geography, John Wiley and Sons
5. Stringer, E.T., 1972: Foundation of Climatology: An Introduction to Physical, Dynamic, Synoptic, and Geographical Climatology, W.H. Freeman & Co. Ltd.

**Web-Based:**

1. <http://uccrn.org/files/2014/02/ARC3-Chapter-3.pdf>
2. <https://www.epa.gov/sites/production/files/2014-6/documents/basicscompendium.pdf>
3. [http://www.cengage.com/resource\\_uploads/downloads/0495555061\\_137181.pdf](http://www.cengage.com/resource_uploads/downloads/0495555061_137181.pdf)
4. <https://unfccc.int/resource/docs/publications/impacts.pdf>
5. <http://dels.nas.edu/resources/static-assets/exec-office-other/climate-change-full.pdf>

**ELECTIVE****Course Title: Geography of Climate Change (Practical)****Course Code: GEG-E9****Marks: 25****Credits: 1****Duration: 15 sessions of 2 hours each**  
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Unit	Title	Practical sessions	Marks
I	Study of weather instruments – Barometer, Maximum & Minimum Thermometer, Wind Vane Collection and analysis of data from automatic weather station	05	8
II	Visit to IMD for hands-on training	10	12
III	Journal		5
		15	25

**References****Mandatory:**

1. Misra, R.P. and Ramesh, A., 2009: Fundamentals of Cartography, Concept Publishing Co., New Delhi
2. Singh, R.L., 2000: Elements of Practical Geography, Kalyani Publishers, New Delhi
3. Singh, R ; Singh L.R., 2001: Mapworks in Practical Geography, Central book Depot, Allahabad
4. Bygott, J., 2001: An Introduction to Map Work and Practical Geography
5. Campbell, J., 2004: Introductory Cartography, Prentice Hall, Inc Englewood

**Supplementary**

1. Chorley, Richard. J. (ed.), 2001: Water, Earth and Man, Methuen & Co., London
2. Monkhouse, F.J. and Wilkinson, H.R., 2009: Maps and Diagrams, B.I. Publications Pvt. Ltd., New Delhi
3. Raisz, E., 2005: General Cartography, McGraw Hills Co., London
4. Robinson, A.H., et al, 2003: Elements of Cartography, John Wiley and Sons, New York

**Web-Based:**

1. <https://mausam.imd.gov.in/>
2. <http://ncert.nic.in/textbook/pdf/kegy308.pdf>
3. <https://www.indiawaterportal.org/>
4. <https://www.weather.gov/media/epz/mesonet/CWOP-WMO8.pdf>
5. [https://nvlpubs.nist.gov/nistpubs/jres/25/jresv25n2p133\\_A1b.pdf](https://nvlpubs.nist.gov/nistpubs/jres/25/jresv25n2p133_A1b.pdf)

**ELECTIVE****Course Title: Oceans: Issues and Challenges (Theory)****Course Code: GEG-E10****Marks: 75****Credits: 3****Duration: 45 lectures of 1 hour each****Prerequisite Courses: Nil****Course Objectives:**

1. To provide the basic conceptual framework of oceanography, its dynamism and the contemporary issues associated with Oceans.

**Course outcomes:**

At the end of this course, students will be able to:

**CO1:** Understand causes, effects and remedial measures for issues related to ocean.

**CO2:** Understand causes and effects of sea level changes and global warming

**CO3:** Understand the concept of CRZ

**CO4:** Understand the concept of coral formation, distribution and threats

Unit	Title	No. of hours	Marks
I	<b>Issues related to oceans</b> Exclusive Economic Zone (EEZ) Case study of Indian and Atlantic ocean Sea level change Coastal regulation zone	15	25
II	Ocean acidification – causes, effects and remedies Ballast water Coral reefs	15	25
III	Global warming and oceans	15	25
		45	75

**References****Mandatory:**

1. K. Siddhartha Oceanography, 2000: A Brief Introduction, Kislaya publishers
2. Defant, A., 2001: Physical Oceanography, Vol. I, Pergamon Press
3. Gautam, Alka. 2004. Climatology and Oceanography. Rastogi Publication-Meerut, UP.
4. Sharma R. C. and Vatal M., 2003: Oceanography for Geographers, Chaitanya Publishing House, Allahabad.
5. Lal, D.S., 2003: Oceanography, ShardaPustakBhavan, Allahabad

**Supplementary:**

1. Singh, S. 2005 : Geomorphology, PrayagPustakBhawan, Allahabad
2. Ahmed, E., 2005: Geomorphology, Kalyani Publishers, New Delhi
3. Bloom, Arthur L., 2004: Geomorphology – A Systematic Analysis of Late Cenozoic Landforms, Prentice Hall, Engle Wood Cliff, N.J
4. Kale V.S. and Gupta Avijit (2000): Introduction to Geomorphology, Orient Black Swan Publications
5. Strahler, A.N., 2000: Physical Geography, 3rd Ed., Wiley

**Web-Based:**

1. <https://pubs.usgs.gov/gip/7000049/report.pdf>
2. [https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5\\_Chapter13\\_FINAL.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter13_FINAL.pdf)
3. [http://curry.eas.gatech.edu/Courses/6140/ency/Chapter10/Ency\\_Oceans/Sea\\_Level\\_Change.pdf](http://curry.eas.gatech.edu/Courses/6140/ency/Chapter10/Ency_Oceans/Sea_Level_Change.pdf)
4. [http://keralaczm.gov.in/pdfs/Coastal\\_Zones\\_of\\_India.pdf](http://keralaczm.gov.in/pdfs/Coastal_Zones_of_India.pdf)
5. [https://oceana.org/sites/default/files/reports/Ocean\\_Acidification\\_The\\_Untold\\_Stories.pdf](https://oceana.org/sites/default/files/reports/Ocean_Acidification_The_Untold_Stories.pdf)

**ELECTIVE****Course Title: Oceans: Issues and Challenges (Practical)****Course Code: GEG-E10****Marks: 25****Credits: 1****Duration: 15 sessions of 2 hours each**

Unit	Title	Practical sessions	Marks
I	Demarcating CRZ (using SOI Toposheet) Bathymetric studies using Eco sounder	10	15
II	Lab work in NIO - sea water analysis Sea sediment analysis, Sea surface temperature	05	05
III	Journal and Viva		05
		15	25

**References****Mandatory:**

1. Misra, R.P. and Ramesh, A., 2005: Fundamentals of Cartography, Concept Pub. Co., New Delhi
2. Singh, R.L., 2000: Elements of Practical Geography, Kalyani Publishers, New Delhi
3. Singh, R ; Singh L.R., 2001: Mapworks in Practical Geography, Central book Depot, Allahabad
4. Sarkar, Ashis, 2000: Practical Geography: A Systematic Approach, Orient Longman Pvt. Ltd., Kolkata.
5. Khullar, D. R. (2000: Essentials Of Practical Geography, New Academic Publishing Co., Jalandar

**Supplementary**

1. Bygot, J., 2001: An Introduction to Map Work and Practical Geography
2. Campbell, J., 2004: Introductory Cartography, Prentice Hall, Inc Englewood
3. Jackson, R.H. and Hudmar, L.E., 2001: Regional Geography: Issues for today
4. Monkhouse, I.J. and Wilkinson, H.R., 2001: Maps and Diagram, B.I. Publication, New Delhi
5. Raisz, E., 2005: General Cartography, McGraw Hills Co., London
6. Robinson, A.H., et al, 2003: Elements of Cartography, John Wiley and Sons, New York

**Web-based:**

1. <https://teara.govt.nz/files/d11801enz.pdf>
2. <http://www.mpcb.gov.in/sites/default/files/water-quality/reports/LSD-NEERI-%20Water%20Quality%20Analysis.pdf>
3. [https://www.who.int/water\\_sanitation\\_health/dwq/2edvol3d.pdf](https://www.who.int/water_sanitation_health/dwq/2edvol3d.pdf)
4. <https://sednet.org/download/wg-282-inf-5-rev-1.pdf>
5. <https://www.nio.org/>

**ELECTIVE****Course Title: Geography of Rural Settlement (Theory)****Course code: GEG-E11****Marks: 75****Credit: 3****Duration: 45 sessions of 1 hour each**  
=====**Prerequisite Courses: Nil****Course Objective:**

1. To acquaint the students with the spatial and structural characteristics of rural settlements and to bring about awareness on special issues related to rural settlements.

**Course Outcomes:**

At the end of this course, students will be able to:

**CO1:** Appreciate the role of topography and climate in shaping rural landscape**CO2:** Understand the dynamics of fringe settlements**CO3:** Evaluate the spatial organization of rural settlements**CO4:** Analyze the impact of urbanization on rural settlements (any two case studies)**CO5:** Infer the internal morphology of villages (any two case studies)

Unit	Course Content	No. Of hours	Marks
I	Introduction to settlement Geography, importance of settlement geography, Definition, Nature, approaches and scope of geography of rural settlements. Status and future of Rural Geography in India Evolution of Rural settlements and the process of settling. Role of sites in evolution of rural settlements, Functional Classification of rural Settlements.	15	25
II	Spatial organization of rural settlements: size, shape, distribution and hierarchy of settlements. Spacing of rural Settlements (Nucleated and Dispersed), Types of rural settlements.	15	25
III	Internal morphology of villages ( Any one village-Goa), Material used , house types in different regions of India and field patterns( Primitive , rectangular and Contour type ), Case Study of two villages of Goa .: Impact of urbanization on house types, pattern, functions and growth of rural settlements. Changing face of rural India.	15	25
		45	75

**References:****Mandatory:**

1. Singh R.L. et al: Reading in rural settlement: Geography Tara Publications, Varanasi.
2. Ghosh Sumita, 1998: Introduction to Settlement Geography, Orient Longman.
3. Cloke Paul, (2013), An Introduction to Rural Settlement Planning, Published by Routledge, Milton Park, Abingdon, Oxon OX14 4SB, UK
4. Mandal, R. B, (2001), Introduction to Rural Settlement, Concept Publishing Company, New Delhi.

**Supplementary:**

1. Clout Hugh (2007) Contemporary Rural Geographies, Routledge, Milton Park, Abingdon, Oxon OX144RN
2. Singh R.Y., 1998: Geography of Settlements, Rawat publications
3. Thomas Chris (2001) Rural Geography, Routledge, London
4. Woods Michael, (2005), Rural Geography: Processes, Responses and Experiences in Rural Restructuring, SAGE Publications Ltd, University of Wales, Aberystwyth
5. Woods Michael, Holloway Lewis & Panelli Ruth (2012) Key Concepts in Rural Geography, Sage Publication, London

**Web-based:**

1. [https://www.kcesmjcollege.in/ICT/Geography/Settlement%20Geography\\_1.pdf](https://www.kcesmjcollege.in/ICT/Geography/Settlement%20Geography_1.pdf)
2. <http://geography.learnontheinternet.co.uk/topics/characteristicsofsettlements.html>
3. [https://shodhganga.inflibnet.ac.in/bitstream/10603/108046/12/12\\_chapter%201.pdf](https://shodhganga.inflibnet.ac.in/bitstream/10603/108046/12/12_chapter%201.pdf)
4. [https://shodhganga.inflibnet.ac.in/bitstream/10603/107916/10/10\\_chapter%202.pdf](https://shodhganga.inflibnet.ac.in/bitstream/10603/107916/10/10_chapter%202.pdf)
5. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.682.7010&rep=rep1&type=pdf>
6. [https://socialsci.libretexts.org/Bookshelves/Geography\\_\(Human\)/Book%3A\\_Introduction\\_to\\_Human\\_Geography\\_\(Dorrell\\_and\\_Henderson\)/12%3A\\_Human\\_Settlements/12.02%3A\\_Rural\\_Settlement\\_Patterns](https://socialsci.libretexts.org/Bookshelves/Geography_(Human)/Book%3A_Introduction_to_Human_Geography_(Dorrell_and_Henderson)/12%3A_Human_Settlements/12.02%3A_Rural_Settlement_Patterns)
7. <https://www.jagranjosh.com/general-knowledge/rural-settlement-1448456206-1>
8. <https://www.yourarticlelibrary.com/geography/rural-settlement-of-people-types-and-patterns/12721>
9. <https://www.slideshare.net/PrvMKt/morphology-of-rural-settlements>
10. [https://shodhganga.inflibnet.ac.in/bitstream/10603/113008/13/13\\_chapter%205.pdf](https://shodhganga.inflibnet.ac.in/bitstream/10603/113008/13/13_chapter%205.pdf)
11. <https://www.indiatoday.in/magazine/cover-story/story/20100215-changing-face-of-rural-india-741950-2010-02-04>
12. <http://inclusion.skoch.in/story/375/the-changing-face-of-rural-india-675.html>

**ELECTIVE****Course title: Geography of Rural Settlement (Practical)****Course Code: GEG-E11****Marks: 25****Credits: 01****Duration: 15 Sessions of 2 hours each**  
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Unit	Title	Practical sessions	Marks
I	<b>Methods in Rural Settlement</b> <ul style="list-style-type: none"><li>• Methods of concentration of rural settlements</li><li>• Methods for measuring spacing of settlements</li><li>• Z test for environmental factors responsible for pattern variation of settlements</li><li>• Measurement of shape (pattern) of rural settlements</li></ul>	8	10
II	<b>Village Survey: Pre-field work, Field work and Post Field work</b> <ul style="list-style-type: none"><li>• Case Study for report:<ol style="list-style-type: none"><li>1. Collection of Socio-Economic and Physical Data</li><li>2. Classification and Tabulation of Data</li><li>3. Inter-relation and Analysis of Data, Maps and Diagrams</li></ol></li></ul>	7	10
III	Journal/ Report writing		5
		15	25

**References:****Mandatory:**

1. Singh R.L. et al: Reading in rural settlement: Geography Tara Publications, Varanasi.
2. Ghosh Sumita, 1998: Introduction to Settlement Geography, Orient Longman
3. Cloke Paul, (2013), An Introduction to Rural Settlement Planning, Published by Routledge, Milton Park, Abingdon, Oxon OX14 4SB, UK
4. Mandal, R. B, (2001), Introduction to Rural Settlement, Concept Publishing Company, New Delhi.

**Supplementary:**

1. Clout Hugh (2007) Contemporary Rural Geographies, Routledge, Milton Park, Abingdon, Oxon OX144RN
2. Mandal. R. B, (2001), Introduction to Rural Settlement, Concept Publishing Company, New Delhi.
3. Thomas Chris (2001) Rural Geography, Routledge, London
4. Woods Michael, (2005), Rural Geography: Processes, Responses and Experiences in Rural Restructuring, SAGE Publications Ltd, University of Wales, Aberystwyth
5. Woods Michael, Holloway Lewis & Panelli Ruth (2012) Key Concepts in Rural Geography, Sage Publication, London



**Web Based:**

1. <https://rashidfaridi.com/2019/09/16/characteristics-of-rural-settlements/>
2. <https://sites.google.com/site/projectjhabua/areas-of-study/ideas-and-solutions/survey-questionnaire/draft-1---questionnaire>
3. <http://ncert.nic.in/textbook/pdf/legy305.pdf>
4. <https://smallbusiness.chron.com/tabulate-survey-results-55613.html>
5. [https://shodhganga.inflibnet.ac.in/bitstream/10603/54430/14/14\\_chapter%20-iii.pdf](https://shodhganga.inflibnet.ac.in/bitstream/10603/54430/14/14_chapter%20-iii.pdf)
6. [https://shodhganga.inflibnet.ac.in/bitstream/10603/140390/14/14\\_chapter%205.pdf](https://shodhganga.inflibnet.ac.in/bitstream/10603/140390/14/14_chapter%205.pdf)

**Course Title: Geography of Urban Settlement (Theory)**

**Course code: GEG-E12**

**Marks: 75**

**Credit: 3**

**Duration: 45 sessions of 1 hour each**

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**Prerequisite Courses: Nil**

**Course objective:**

1. To acquaint the students with the spatial and structural characteristics of urban settlements and to bring about awareness on special issues related to urban settlements.

**Course Outcomes:**

At the end of this course, students will be able to:

**CO1:** Understand the various concepts of urbanization, urban systems, functions of urban places, site and situation

**CO2:** Understand certain issues of urban development.

**CO3:** Apply urban theories and models in the present day context.

**CO4:** Apply basic tools in demographic, urban hierarchy and ranking of urban settlement

**CO5:** Using tools of urban geography, conduct mini research of town or city.

**CO6:** Demonstrate urban network using  $\alpha$ ,  $\beta$ ,  $\gamma$  index.

**CO7:** Create graphical representations of hierarchy of settlements using rank size rule and primate city concept.

Unit	Course Content	No. Of hours	Marks
I	Introduction to urban geography Nature, approach and scope of urban geography. Development of urban geography. Definition of urban places, problems of defining urban places in Indian Context. Site and situations of urban places (towns and cities) Functional classification of towns	15	25
II	Systems and Models in Urban Geography Hierarchy of Urban settlements, Urban morphology, theories related to urban landuse (concentric, multi nuclei and sector theory). urban systems – suburb, rural urban fringe	15	25
III	Problems of urbanization Problems of urbanization with special reference to slums, pollution, urban climate, garbage management	15	25
		45	75

**References:****Mandatory:**

1. Siddhartha & Mukherjee (2007) Cities, Urbanisation and Urban Systems, Kishore Publications, New Delhi
2. Hall T. & Barret L.H (2012) Urban Geography, Routledge, London

**Supplementary:**

1. Cater Harold (2002 )The Study of Urban Geography, Arnold, London , U K
2. Fisher W.B (2013) Urban Geography, Elsevier Science
3. Hall Tim (2010) Urban Geography (Third Edition) Routledge, London

**Web-based:**

1. <https://www.thoughtco.com/overview-of-urban-geography-1435803>
2. <https://ibis.geog.ubc.ca/~ewyly/g350.html>
3. <https://www.yourarticlelibrary.com/geography/urban-geography-meaning-scope-and-concepts-with-statistics/39922>
4. [http://www.yorku.ca/anderson/Intro%20Urban%20Studies/Unit1/what\\_is\\_urban.htm](http://www.yorku.ca/anderson/Intro%20Urban%20Studies/Unit1/what_is_urban.htm)
5. <https://www.thoughtco.com/site-and-situation-1435797>
6. <https://www.jagranjosh.com/general-knowledge/functional-classification-of-towns-1448687516-1>
7. <https://www.thoughtco.com/urban-geography-models-1435764>
8. <https://www.tutor2u.net/geography/reference/7-characteristics-of-the-rural-urban-fringe>
9. <https://www.yourarticlelibrary.com/urbanisation/11-major-problems-of-urbanisation-in-india/19880>
10. <https://www.habitatforhumanity.org.uk/blog/2018/09/urbanisation-slum-housing/>
11. <https://greentumble.com/environmental-problems-of-urbanization/>
12. <https://climatekids.nasa.gov/heat-islands/>
13. <https://www.opengeography.org/ch-9-urban-geography.html>

**ELECTIVE****Course Title: Geography of Urban Settlement (Practical)****Course code: GEG-E12****Marks: 25****Credit: 1****Duration: Session of 2 hours each**

Unit	Content	Practical sessions	Marks
I	<b>Demographic aspects of urban geography:</b> <ol style="list-style-type: none"> <li>1. Time series analysis of urban growth, rate of change and level of urbanization</li> <li>2. Applicability of Rank Size rule and hierarchy with settlement data (normal and log),</li> <li>3. Calculation of CBD by Vance and Murphy.</li> <li>4. Calculation of Urban Sprawl.</li> </ol>	8	10
II	<b>Mapping of Urban linkages:</b> <ol style="list-style-type: none"> <li>1. Network analysis (Alpha, Beta and Gamma indices),</li> <li>2. Flow matrix,</li> <li>3. Connectivity mapping,</li> <li>4. Hierarchy of settlements based on population (using census data).</li> </ol>	7	10
III	<b>Journal</b>		5
		15	25

**References:****Mandatory:**

1. Siddhartha & Mukherjee (2007) Cities, Urbanisation and Urban Systems, Kishalay Publications, New Delhi
2. Hall T. & Barret L.H (2012) Urban Geography, Routledge, London

**Supplementary:**

1. Cater Harold (2002) The Study of Urban Geography, Arnold, London, U. K
2. Fisher W.B (2013) Urban Geography, Elsevier Science
3. Hall T. & Barret L.H (2012) Urban Geography, Routledge, London
4. Hall Tim (2010) Urban Geography (Third Edition) Routledge, London
5. Siddhartha & Mukherjee (2007) Cities, Urbanisation and Urban Systems, Kishalay Publications, New Delhi

**Web Based:**

1. [https://www.e-education.psu.edu/geog597i\\_02/node/688](https://www.e-education.psu.edu/geog597i_02/node/688)
2. <https://population.un.org/wup/General/GlossaryDemographicTerms.aspx>
3. [https://transportgeography.org/?page\\_id=5981](https://transportgeography.org/?page_id=5981)
4. <https://rashidfaridi.com/2019/02/10/urban-primacythe-primate-city-and-rank-size-rule/>
5. [http://www.mrtredinnick.com/uploads/7/2/1/5/7215292/primite\\_cities\\_and\\_the\\_rank-size\\_rule.pdf](http://www.mrtredinnick.com/uploads/7/2/1/5/7215292/primite_cities_and_the_rank-size_rule.pdf)

**Semester VI**  
**Updated On 16<sup>th</sup> March 2020**

**CORE**

**Course Title: Geography of Population Growth (Theory)**

**Course code: GEG-VI.C8**

**Marks: 75**

**Credits: 3**

**Duration: 45 lectures of 1 hour each**

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**Prerequisite Courses: Nil**

**Course Objectives:**

1. To understand and evaluate the basic concept of Population growth to enable students to identify different issues related to population growth.

**Course Outcomes:**

At the end of this course, students will be able to:

**CO1:** Understand the determinants of population growth

**CO2:** Analyze world population patterns of distribution and growth trends.

**CO3:** Calculate fertility, mortality, density of population.

**CO4:** Correlate population characteristics among LDC and MDC.

**CO5:** Evaluate family welfare programmes in India.

**CO6:** Graphically represent population trends and projections in LDC & MDC

Unit	Topic	No. of hours	Marks
I	<b>Determinants of population growth</b> Fertility and mortality: definition types and factors affecting Application of demographic transition: India and its States <b>Migration:</b> Nature, Types, Classification, Determinants, Consequences	15	25
II	Spatial Distribution of Population-factors, Measures of Population Density, World and India, Population Growth- Global Trends, Trends in India. Demographic Transition Model.	15	25
III	<b>Population Policies and Issues:</b> Population Policies in Context of Growth- Less Developed Countries & More Developed Countries. Evolution of Family Welfare Programme in India. National Population Policies in India Population Dividend in India	15	25
		45	75

**References:****Mandatory:**

1. Chandna R. C.(2000), Geography of Population:Concept, Determinants and Patterns, Kalyani Publishers, New Delhi
2. Bhende and Kanitkar (2011), Principles of Population Studies, Himalaya Publishing House, Delhi
3. Sundaram, K.V. &Nangia, Sudesh (1986), Population geography- Contributions to Indian Geography. Vol 6 , Heritage Publications

**Supplementary:**

1. Clarke J. I (1972), Population Geography, Pergamon Press, Oxford.
2. Mitra & Kamaljit Chandra, (2005) Population Studies and Demography: Vol. 4 Concept of Population Geography, Delhi

**Web-based:**

1. <http://www.businessdictionary.com/definition/population-growth.html>
2. <https://humangeography.pressbooks.com/chapter/2-1/>
3. <https://www.bbc.co.uk/bitesize/guides/zpgjk2p/revision/1>
4. <https://www.britannica.com/science/population-biology-and-anthropology/Natural-increase-and-population-growth>
5. <https://www.toppr.com/guides/geography/population/population-of-india/>
6. <https://www.nature.com/scitable/knowledge/library/an-introduction-to-population-growth-84225544/>

**CORE****Course Title: Geography of Population Growth (Practical)****Course code: GEG-VI.C-8****Marks: 25****Credits: 1****Duration: 15 Session of 2 hours each**

Unit	Topic	Practical Session	Marks
I	a) Calculation of Fertility and mortality b) Calculation of rate of migration c) Arithmetic Density (calculation and representation) d) Rural and urban Density e) Population Concentration Indexes f) Proportional Circles.	5	10
II	a) Calculation of Population Projection. (any one method) b) Field visit to Census Department / mini project	10	10
III	Journal		5
		15	25

\* All practicals to be done on computer

**References:****Mandatory:**

1. Chandna, R.C. (2010): Geography of Population : Concepts, Determinants and Patterns, Kalyani Publishers, New Delhi,.
2. Monkhouse F.J. and Wilkinson H.R. (1966): Maps and Diagrams: Their Compilation and Construction, Methuen Publishing Ltd. London
3. Census of India Series – 1 India Provisional Population Tables, Published by Register General and Census Commissioner, India 2001.

**Supplementary:**

1. Beaujeu-Garnier J (1966): Geography of Population, Longmans, London
2. Clark, L. 1965: Population Geography, Permagon press, New York.
3. Singh Gopal (1998): Map Work and Practical Geography; Vikas Publishing House
4. Trewartha, G.T. 1969: A Geography of Population : World Patterns, John Willey and Sons, Inc. New York

**Web Based:**

1. <http://ocw.jhsph.edu/courses/PopulationChange/PDFs/Lecture4.pdf>
2. <https://study.com/academy/lesson/net-migration-rate-definition-formula-statistics.html>
3. <https://www.cdc.gov/csels/dsepd/ss1978/lesson3/section3.html>
4. [https://www.medindia.net/health\\_statistics/general/birth-rate-death-rate-india-statistics.asp#](https://www.medindia.net/health_statistics/general/birth-rate-death-rate-india-statistics.asp#)
5. <https://www.statisticshowto.com/population-density-definition/>
6. <https://www.ibrc.indiana.edu/ibr/2006/summer/article1.html>
7. <https://sites.google.com/site/skillsa229/proportional-circles>
8. [http://maps.unomaha.edu/Peterson/geog1000/PopulationProjections/Population\\_Projections\\_GEOG1000-Answers.pdf](http://maps.unomaha.edu/Peterson/geog1000/PopulationProjections/Population_Projections_GEOG1000-Answers.pdf)
9. <https://sciencing.com/calculate-population-projections-8473012.html>
10. <https://owlcation.com/academia/How-to-Plan-a-Field-Trip>

**ELECTIVE****Course Title: Introduction to Regional Planning (Theory)****Course Code: GEG-E13****Marks: 75****Credits: 3****Duration: 45 lectures of 1 hour each**  
=====**Prerequisite Courses:** Nil**Course Objectives:**

1. To understand and evaluate the concept of regional planning, its role and relevance in region planning. To identify issues relating to the development of a region.
2. To identify the causes of regional disparities in development, perspectives and policy imperatives.

**Course Outcomes:**

At the end of this course, students will be able to:

**CO1:** Gain knowledge of basic concepts in regional planning from a geographer's perspectives**CO2:** Understand the concept of Regional Planning and its variations across time and space**CO3:** Correlate and distinguish various types of regional planning and apply the same to the local settings.**CO4:** Delineate formal, functional and planning regions

Unit	Topic	No. Of hours	Marks
I	<b>Definition and methods:</b> Planning – definition, approach, Levels of planning (national, state, local planning) basis of planning.	15	25
II	<b>Types of planning</b> Concept of planning region Land use planning. Delineation of planning region Regional policy and regional planning Types of planning : sectoral /area , physical/perspective	15	25
III	<b>Levels of development, disparities and case studies:</b> Indicators of development, planning unit Economic, social, demographic and ecological implications	15	25
		45	75

**References:****Mandatory:**

1. Mishra R.P. Regional Planning, a Reader, Concept Tools, Techniques and Case Studies, Mysore University Press.
2. Sundaram K. V. (1977), Urban And Regional Planning In India, Vikas Publishing House, New House, New Delhi.



**Supplementary:**

1. Chand, Mahesh And Puri K(1983), Regional Planning In India, All Publishers, New Delhi
2. Freeman T. W.(1958), Geography And Planning, Hutchinsen University, London
3. Gadgild.R., Planning In India, Asia Publishing House
4. Glicksen A. (1955), Regional Planning And Development, Leiden
5. John Glasson And Timmarshall (2007): Regional Planning; Taylor And Francis

**Web Based:**

1. [https://shodhganga.inflibnet.ac.in/bitstream/10603/47404/6/06\\_chapter%201.pdf](https://shodhganga.inflibnet.ac.in/bitstream/10603/47404/6/06_chapter%201.pdf)
2. <https://www.arl-net.de/de/commin/belarus/3-planning-levels-and-specific-aspects>
3. <https://www.drishtias.org.in/multi-level-planning.html>
4. <http://egyankosh.ac.in/bitstream/123456789/31790/1/Unit-3.pdf>
5. <https://www.measureevaluation.org/resources/training/online-courses-and-resources/non-certificate-courses-and-mini-tutorials/population-analysis-for-planners/lesson-1>
6. <http://www.ncert.nic.in/ncerts/1/lebs104.pdf>
7. <https://planningtank.com/development-plan/land-use-planning>
8. <https://www.kullabs.com/classes/subjects/units/lessons/notes/note-detail/5681>
9. <https://www.tutor2u.net/geography/reference/the-8-key-gap-indicators-of-development>

**ELECTIVE****Course Title: Introduction to Regional Planning (Practical)****Course Code: GEG-E13****Marks: 25****Credits: 1****Duration: 15 session of 2 hours each**  
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Unit	Topic	Practical sessions	Marks
I	<b>Delineation of planning region</b> Five functional regions	7	10
II	<b>Delineation of planning region</b> Five formal regions	8	10
III	Journal		5
		15	25

**References:****Mandatory:**

1. William Ian Morrison, Peter Smith, 1977: Input-Output Methods In Urban And Regional Planning: A Practical Guide; Pergamon Press
2. Chand Mahesh & Puri, V.K. (2000), Regional Planning In India

**Supplementary:**

1. Kumar, et. Al., (2016): urban and regional planning education-learning for India. Springer, Singapore
2. Matthew Dalbey, (2002): Decentralization And Regional Planning: Practical And Ideological Problems, Springer, U.S.
3. United States. National Resources Planning Board(1940), Is Planning Practical For Your Town?: New England Regional Planning Commission, Boston, Mass

**Web Based:**

1. <https://planningtank.com/regional-planning/delineation-of-formal-regions>
2. <https://www.coursehero.com/file/31907522/REGIONALISATION-AND-THE-DELINEATION-OF-REGIONSdocx/>
3. <https://planningtank.com/regional-planning/delineation-of-functional-regions>
4. <https://rashidfaridi.com/2017/04/04/planning-regions-of-india-conceptclassification-and-delineation/>
5. <https://unacademy.com/lesson/regionalisation-and-delineation-of-formal-and-functional-regions/DAY7U2XX>

**ELECTIVE****Course Title: Fundamentals of Economic Geography (Theory)****Course Code: GEG-E14****Marks: 75****Credits: 3****Duration: 45 lectures of 1 hour each**  
=====**Prerequisite Courses:** Nil**Course Objectives:**

1. The course introduces economic geography as a dynamic, diverse and contested body of knowledge.
2. Students will be familiar with basic concepts of economic geography.

**Course Outcomes:**

At the end of this course, students will be able to:

**CO1:** Gain insights into the concepts and theoretical approaches in Economic Geography.**CO2:** Understand and apply theories and models of economic geography in present day context**CO3:** Apply and compare the global economic patterns with local economic scenarios**CO4:** Collect and analyze the spatial data of economic and commercial establishments to determine spatio-temporal changes.

Unit	Topic	No. Of hours	Marks
I	Fundamental concept in economic geography Classification of economic activity (primary to quinary) Standard industrial classification world and India Approaches in economic geography: traditional and modern	15	25
II	Concepts and models in economic geography Complementarity, intervening opportunity substitute, agglomeration. Location models : hotelling, Weber, central place	15	25
III	Applications of economic geography. Agriculture Industry Trade and transport	15	25
		45	75

**References:****Mandatory:**

1. Siddhartha K. (2016) Economic Geography, **Kitabmahal**
2. Combespierre-Philippe, Mayerthierry and Thissejacques-François (2008) Economic Geography the Integration of Regions and Nations. Princeton University Press Princeton And Oxford, Princeton, New Jersey

**Supplementary:**

1. Haninkdean M. (2012) Principles and Applications of Economic Geography: Economy, Policy, Environment, John Wiley& Sons
2. Miroslav N. Jovanovic(2009) Evolutionary Economic Geography, Location Of Production And The European union Routledge, London And New York
3. M. Sokol (2011) Economic Geography. Undergraduate Study In Economics, Management, Finance And The Social Sciences, University Of London.
4. Pachurapiotr (2011) The Economic Geography Of Globalization, (Ed) Intech Pub.
5. Sharmistha Bagchi-Sen And Helenlawton Smith (2006) Economic Geography Past, Present And Future (Edited). Routledge, USA.

**Web Based:**

1. [https://www.e-education.psu.edu/geog597i\\_02/node/788](https://www.e-education.psu.edu/geog597i_02/node/788)
2. [http://dl.booktolearn.com/ebooks2/science/economy/9781138924512\\_An\\_Introduction\\_t  
o\\_Economic\\_Geography\\_0868.pdf](http://dl.booktolearn.com/ebooks2/science/economy/9781138924512_An_Introduction_to_Economic_Geography_0868.pdf)
3. [https://london.ac.uk/sites/default/files/uploads/gy2164-economic-geography-study-  
guide.pdf](https://london.ac.uk/sites/default/files/uploads/gy2164-economic-geography-study-guide.pdf)
4. [https://www.economicsdiscussion.net/economics-2/classification-of-economic-  
activities/2149](https://www.economicsdiscussion.net/economics-2/classification-of-economic-activities/2149)
5. [https://www.yourarticlelibrary.com/economics/economic-activities-and-its-  
classifications/25429](https://www.yourarticlelibrary.com/economics/economic-activities-and-its-classifications/25429)
6. <http://mospi.nic.in/classification/national-industrial-classification>
7. [https://unstats.un.org/unsd/publication/seriesM/seriesm\\_4rev4e.pdf](https://unstats.un.org/unsd/publication/seriesM/seriesm_4rev4e.pdf)
8. [https://www.e-education.psu.edu/geog597i\\_02/node/768](https://www.e-education.psu.edu/geog597i_02/node/768)
9. [https://link.springer.com/chapter/10.1007/978-3-030-26626-4\\_7](https://link.springer.com/chapter/10.1007/978-3-030-26626-4_7)
10. [https://transportgeography.org/?page\\_id=5260](https://transportgeography.org/?page_id=5260)

**ELECTIVE****Course Title: Fundamentals of Economic Geography (Practical)****Course Code: GEG-E14****Marks: 25****Credits: 1****Duration: 15 sessions of 2 hours each**  
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Unit	Topic	Practical sessions	Marks
I	Calculation of bid rent model Industrial location using Webbers Calculation of $k_3$ , $k_4$ and $k_7$	10	10
II	Field work: data collection, representation and report writing.	10	10
III	Journal		05
		15	25

**References:****Mandatory:**

1. Siddhartha K. (2016) Economic Geography, **Kitabmahal**
2. Combespierre-Philippe, Mayerthierry and Thissejacques-François (2008) Economic Geography the Integration of Regions and Nations. Princeton University Press Princeton And Oxford, Princeton, New Jersey

**Supplementary:**

1. Haninkdean M. (2012) Principles and Applications of Economic Geography: Economy, Policy, Environment, John Wiley& Sons
2. Miroslav N. Jovanovic (2009) Evolutionary Economic Geography, Location of Production and the European Union. Routledge, London And New York
3. M. Sokol (2011) Economic Geography. Undergraduate Study in Economics, Management, Finance and the Social Sciences, University of London.
4. Pachurapiotr (2011) The Economic Geography Of Globalization, (Ed) Intech Pub.
5. Sharmistha Bagchi-Sen and Helenlawton Smith (2006) Economic Geography Past, Present and Future (Edited). Routledge, USA.

**Web Based:**

1. [https://www.e-education.psu.edu/geog597i\\_02/node/788](https://www.e-education.psu.edu/geog597i_02/node/788)
2. <http://economics-files.pomona.edu/cconrad/LandRent.pdf>
3. <https://planningtank.com/settlement-geography/central-place-theory-walter-christaller>
4. [https://www.e-education.psu.edu/geog597i\\_02/node/681](https://www.e-education.psu.edu/geog597i_02/node/681)
5. <http://uprav.ff.cuni.cz/?q=system/files/christaller.pdf>
6. <https://libguides.usc.edu/writingguide/fieldreport>
7. <http://visionpointnios.co.in/courses/316/E-JHA-31-10A.pdf>

**ELECTIVE****Course Title: Geography of Tourism (Theory)****Course Code: GEG-E15****Marks: 75****Credits: 3****Duration: 45 lectures of 1 hour each**  
=====**Prerequisite Courses:** Nil**Course Objectives:**

1. The course aims to understand the basics of tourism and its impact on physical and human environments.

**Course Outcomes:**

At the end of this course, students will be able to:

**CO1:** Understand the concepts of travel and tourism.**CO2:** Analyze the role of geographic factors in tourism development**CO3:** Evaluate the socio-cultural, economic and environmental factors and their impacts on tourism (any two case studies)**CO4:** Evaluate the tourism development in Goa (historical to present)**CO5:** Analyze the challenges of tourism industry in Goa

Unit	Title	No. of hours	Marks
I	<b>Introduction to Tourism:</b> <ul style="list-style-type: none"><li>• Meaning, definition and concept of Tourism</li><li>• Characteristics and types of Tourism</li><li>• Historical development of Tourism</li><li>• Scope and importance of Tourism</li><li>• Careers in Tourism</li><li>• Trends in Tourism Geography</li></ul>	15	25
II	<b>Geographic factors in Tourism Development:</b> <ul style="list-style-type: none"><li>• Physical factors: Relief, climate, vegetation, water bodies</li><li>• Socio-cultural factors: historical, cultural, economic, religious factors</li></ul> <b>Geographic Areas and tourism impacts:</b> <ul style="list-style-type: none"><li>• Economic, socio-cultural, environment and sustainable development of tourism</li></ul>	20	25
III	<b>Tourism resources in Goa</b> <ul style="list-style-type: none"><li>• Development of tourism in Goa</li><li>• Types of tourism in Goa</li><li>• Social Economic and Environmental issues</li><li>• Emerging careers in tourism in Goa</li></ul>	10	25
		45	75

**References:****Mandatory:**

1. Bhatia, A.K., 2002: Tourism Development: Principles and Practices, Sterling Publishers Pvt. Ltd
2. Williams Stephen, 2009: Tourism Geography: A new synthesis, Routledge Taylor and Francis Group, London and New York

**Supplementary:**

1. Claude Alvares (2002): Fish Curry and Rice; A Goa Foundation Publication
2. Dhar Premnath, 2009: Development Of Tourism & Travel Industry: An Indian Perspective, Kanishka Publishers
3. Hall. C.M, Page Stephen, 2014: The Geography of Tourism and Recreation: Environment, Place, Space, Routledge Taylor and Francis Group, London and New York
4. Velvet Nelson, 2013: An Introduction to Geography of Tourism, Rowman & Littlefield Publishers

**Web based:**

1. <https://www.economy.gov.ae/Publications/An%20Introduction%20to%20Tourism%200750619562.pdf>
2. <https://opentextbc.ca/introtourism/chapter/chapter-1-history-and-overview/>
3. <https://www.tandfonline.com/doi/full/10.1080/14616688.2017.1307442>
4. <https://www.diva-portal.org/smash/get/diva2:16436/FULLTEXT01.pdf>
5. [https://www.researchgate.net/publication/283487046\\_SUSTAINABLE\\_TOURISM\\_PLANNING\\_IN\\_GOA](https://www.researchgate.net/publication/283487046_SUSTAINABLE_TOURISM_PLANNING_IN_GOA)
6. [https://shodhganga.inflibnet.ac.in/bitstream/10603/33015/11/11\\_chapter%2004.pdf](https://shodhganga.inflibnet.ac.in/bitstream/10603/33015/11/11_chapter%2004.pdf)

**ELECTIVE****Course Title: Geography of Tourism (Practical)****Course Code: GEG-E15****Marks: 25****Credits: 1****Duration: 15 sessions of 2 hours each**  
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Unit	Title	Practical Sessions	Marks
I	Preparation and understanding of Tourist maps Preparation tourist circuit maps	05	10
II	Preparation of Information Charts of tourism sites of India and Goa Field visit, preparing a brochure and presentation	10	10
	Journal		5
		15	25

**References:****Mandatory:**

1. Bhatia, A.K., 2002: Tourism Development: Principles and Practices, Sterling Publishers Pvt. Ltd
2. Williams Stephen, 2009: Tourism Geography: A new synthesis, Routledge Taylor and Francis Group, London and New York

**Supplementary:**

1. Claude Alvares (2002): Fish Curry and Rice; A Goa Foundation Publication
2. Dhar Premnath, 2009: Development Of Tourism & Travel Industry: An Indian Perspective, Kanishka Publishers
3. Hall. C.M, Page Stephen, 2014: The Geography of Tourism and Recreation: Environment, Place, Space, Routledge Taylor and Francis Group, London and New York
4. Velvet Nelson, 2013: An Introduction to Geography of Tourism, Rowman & Littlefield Publishers

**Web Based:**

1. [https://www.researchgate.net/publication/317032762\\_Tourist\\_maps\\_-\\_definition\\_types\\_and\\_contents](https://www.researchgate.net/publication/317032762_Tourist_maps_-_definition_types_and_contents)
2. <http://www.kaleyann.com/create-custom-travel-map/>
3. <https://www.tourismcouncilwa.com.au/guide-planning-tour-itinerary>
4. [http://tourism.gov.in/sites/default/files/chapter/PIDCC\\_scheme.pdf](http://tourism.gov.in/sites/default/files/chapter/PIDCC_scheme.pdf)
5. <https://www.india-tourism.net/maps.htm>
6. <https://www.kevinandamanda.com/create-a-custom-travel-map-with-google-maps/>



**ELECTIVE****Course Title: Quantitative Techniques in Geography****Course Code: GEG-E16****Marks: 100****Credit: 04****Duration: 60 hours**  
=====**Prerequisite Courses:** Nil**Course Objectives:**

1. To introduce statistical techniques, relevant to geographical research.
2. To acquaint students about the potentials and applications of statistical techniques.

**Course Outcomes:**

At the end of this course, students will be able to:

**CO1:** Acquire knowledge of drawing inferences using the geographical database**CO2:** Develop an understanding and appreciation of the mutual dependence of different techniques and their relevance.**CO3:** Formulate and test the hypothesis**CO4:** Use of open source software for Statistical analysis**CO5:** Estimate and predict trends and patterns of geographical phenomena.

Unit No.	Course Content	No. of hours	Marks
I	<b>Non- Parametric Statistics</b> Co-relation and Regression analysis a) Scatter Diagram b) Karl Person's Co-efficient correlation c) Spearman's rank correlation d) Kendall's rank correlation regression analysis. <b>Parametric</b> Hypothesis testing a) Meaning, types of hypothesis Testing of hypothesis i) Chi-square test ii) ANOVA iii) t- test	15	30
II	Index numbers Unweighted, weighted indices and Cost of Living Index	15	30
III	Analysis of geographical dataset using appropriate software, interpretation and report writing	30	40
		60	100

**References:****Mandatory:**

1. Zamir Alvi 2000: Statistical Geography: Method and Applications Rawat Publications, New Delhi
2. Gregory, 1963: Statistical methods and the Geographer, Longman S. London
3. Rastogi R.S.(2005): Elementary Statistics: Rohit Publications – Delhi-110 006
4. Johnson R.J. 1980: Multivariate statistical Analysis in Geography, Longman

**Supplementary:**

1. Gupta S.P.; 1979: Practical Statistics; S. Chand and Co.
2. Khan Z.A 1998: Text book of practical Geography – New Delhi
3. Pal Saroj K. 1982: Statistical Techniques: A basic approach to Geography: Tata – McGraw Hill, New Delhi.
4. P.K. Majumdar 2002: Statistics: A Tool for Social Sciences, Rawat Publications: Jaipur & New Delhi.
5. Succheti D.C. and Kapoor V.K. 2002 - statistics (Theory, methods and application)

**Web Based:**

1. <https://www.statisticssolutions.com/correlation-pearson-kendall-spearman/>
2. <https://www.statisticssolutions.com/kendalls-tau-and-spearman-rank-correlation-coefficient/>
3. <https://www.toppr.com/guides/economics/index-numbers/index-numbers-in-general/>
4. [https://wps.prenhall.com/wps/media/objects/9431/9657451/Ch\\_16/levine-smume6\\_topic\\_16-08.pdf](https://wps.prenhall.com/wps/media/objects/9431/9657451/Ch_16/levine-smume6_topic_16-08.pdf)
5. <https://www.nap.edu/read/4913/chapter/6>
6. <https://www.who.int/entity/chp/steps/Part4.pdf?ua=1>

## Course Learning Outcomes

S.N.	Course Code	Course Title	Course Learning Outcomes
1	GEG-I.C1	Introduction to Geography	At the end of this course, students will be able to: <b>CO5:</b> Understand fundamental concepts and dichotomies in geography <b>CO6:</b> Analyze the interrelationships among fundamental concepts of geography <b>CO7:</b> Acquire Basic cartographical skills such as basic elements of map and map reading, area measurements, time calculation <b>CO8:</b> Differentiate and evaluate different domains of geography
2	GEG-I.C2	Fundamentals of Physical Geography	At the end of this course, students will be able to: <b>CO5:</b> Understand fundamentals of physical geography <b>CO6:</b> Apply techniques to represent different relief features <b>CO7:</b> Interpret the characteristics and associate with other relief features <b>CO8:</b> Analyze and interpret climate data
3	GEG-II.C3	Basics of Human Geography	At the end of this course, students will be able to: <b>CO6:</b> Understanding of fundamental concepts of Human Geography <b>CO7:</b> Understand and analyze human related issues in societies <b>CO8:</b> Develop an understanding of basic quantitative techniques used in Human geography <b>CO9:</b> Collect, process and analyse socio economic data <b>CO10:</b> Visually illustrate population data
4	GEG-II.C4	Basics of Regional Geography	At the end of this course, students will be able to: <b>CO8:</b> Understand Fundamental concepts of regional geography <b>CO9:</b> Apply techniques of regionalization <b>CO10:</b> Differentiate among different regions spatial organization and areal variation in human activities. <b>CO11:</b> Develop an understanding of basic quantitative techniques used in regional geography. <b>CO12:</b> Develop the skill of calculation of different indicators of development. <b>CO13:</b> Diagrammatically represent and interpret regional data <b>CO14:</b> Represent and interpret characteristics of various regions.
5	GEG-III.C5	Cartography	At the end of this course, students will be able to: <b>CO7:</b> Understand the basic cartographic concepts <b>CO8:</b> Develop cartographic skills taught in the practical component of this course. <b>CO9:</b> Understand map projections construction, properties, merits – demerits and their applications <b>CO10:</b> Understand projections by using maps

			<b>CO11:</b> Develop the skill to create basic map <b>CO12:</b> Know the mapping organizations in India
6	GEG-E1.	Socio Economic survey in Human Geography	At the end of this course, students will be able to: <b>CO5:</b> Understand basic concepts of Socio Economic Surveying <b>CO6:</b> Develop the skill of questionnaire formulation <b>CO7:</b> Independently collect data from field using online apps and manually <b>CO8:</b> Process, analyze, graphically represent and interpret data.
6	GEG-E2	Field Survey in Physical Geography	At the end of this course, students will be able to: <b>CO5:</b> Understand functions and applications of dumpy level, Plane table and Global Positioning Systems (GPS) in field based studies. <b>CO6:</b> Independently handle survey instruments and prepare maps and field reports. <b>CO7:</b> Have hands-on training on using survey instruments in final year project work <b>CO8:</b> Detect the change in the spatial extension of area, locality and region.
7	GEG-E3	Participatory Rapid Appraisal Techniques	At the end of this course, students will be able to: <b>CO5:</b> Be familiar with the basic concepts of PRA techniques <b>CO6:</b> Develop the skill to prepare questionnaires and Schedules for different PRA techniques. <b>CO7:</b> Understand the application of PRA techniques in geographical studies <b>CO8:</b> Accurately analyze and interpret the data collected using PRA techniques
8	GEG-E4	Application of Computer in Geography	At the end of this course, students will be able to: <b>CO6:</b> Understand functioning of different e-sources of geographical data <b>CO7:</b> Understand and its binary coding <b>CO8:</b> Prepare cartograms that can be used for various geographical applications using computers <b>CO9:</b> Represent geo-data using excel <b>CO10:</b> Identify and apply appropriate cartograms for given data set
9	GEG-IV.C6	Basics of Geomorphology	At the end of this course, students will be able to: <b>CO6:</b> Understand basic concepts of Geomorphology. <b>CO7:</b> Understand theories of continental drifts, Isostasy sea floor spreading, <b>CO8:</b> Analyze different types of slopes using contouring method. <b>CO9:</b> Identify and distinguish geomorphic processes and landforms created by winds, underground water. <b>CO10:</b> Analyze river basin based on morphometric parameters. <b>CO11:</b> Identify and independently interpret relief features and their associations on SOI toposheets.

10	GEG-E5	Basics of Climatology	<p>At the end of this course, students will be able to:</p> <p><b>CO7:</b> Understand and analyze the concepts in atmospheric stability.</p> <p><b>CO8:</b> Distinguish different mechanisms of Indian monsoon.</p> <p><b>CO9:</b> Associate the indicators of changing climate to the day to day weather dynamics.</p> <p><b>CO10:</b> Apply climatic concepts in issues related to agriculture, health and disasters.</p> <p><b>CO11:</b> Represent weather phenomenon using weather station model.</p> <p><b>CO12:</b> Have hands on experience of handling weather instruments, calibrating, reading, interpretation and forecasting.</p>
11	GEG-E6	Basics of Oceanography	<p>At the end of this course, students will be able to:</p> <p><b>CO6:</b> Develop an understanding of the ocean bottom relief features of Indian, Atlantic and Pacific ocean</p> <p><b>CO7:</b> Understand and test the physical properties of ocean water using scientific instruments.</p> <p><b>CO8:</b> Understanding the types of marine deposition and its relation with man</p> <p><b>CO9:</b> Read and interpret bathymetric and hydrographic charts</p> <p><b>CO10:</b> Prepare bathymetric chart using interpolation method.</p>
12	GEG-E7	Regional Geography of India	<p>At the end of this course, students will be able to:</p> <p><b>CO5:</b> Have an understanding of the inter linkages and interaction between physical aspects and resource base of India and Goa</p> <p><b>CO6:</b> Learn the skills of choosing appropriate cartographic techniques to quantitatively represent regional aspects of India and Goa</p> <p><b>CO7:</b> Infer the processes that operate through space and time in different regions of India and Goa</p> <p><b>CO8:</b> Understand the recent development and changes in context of India.</p>
13	GEG-E8	Regional Geography of USA	<p>At the end of this course, students will be able to:</p> <p><b>CO5:</b> Understand the physical landscape of USA.</p> <p><b>CO6:</b> Understand the Socio-Cultural, Demographic, Political and Economic aspects of USA</p> <p><b>CO7:</b> Infer the processes that operate through space and time in different regions of USA</p> <p><b>CO8:</b> Understand the recent transnational developments in USA and their impacts on India</p>
14	GEG-V.C7	Geomorphology: Landforms and Processes	<p>At the end of this course, students will be able to:</p> <p><b>CO7:</b> Understand the nine fundamental concepts of Geomorphology.</p> <p><b>CO8:</b> Understand theories of plate tectonics, mountain building, drainage systems and patterns.</p> <p><b>CO9:</b> Identify and distinguish geomorphic processes and landforms created by rivers.</p>

			<b>CO10:</b> Identify and distinguish geomorphic processes and landforms created by glaciers. <b>CO11:</b> Prepare Slope map using aspect map and isotan map. <b>CO12:</b> Independently prepare a drainage map.
15	GEG-E9	Geography of Climate Change	At the end of this course, students will be able to: <b>CO7:</b> Understand and analyze the concepts in urban climate. <b>CO8:</b> Distinguish different mechanisms of city weather modifications. <b>CO9:</b> Associate the indicators of changing climate to the day to day weather dynamics. <b>CO10:</b> Apply climatic concepts in issues related to agriculture, health and disasters. <b>CO11:</b> Understand the working of weather instruments <b>CO12:</b> Set up, calibrate weather instruments, collect readings and interpret weather data
16	GEG-E10	Oceans: Issues and Challenges	At the end of this course, students will be able to: <b>CO5:</b> Understand causes, effects and remedial measures for issues related to ocean. <b>CO6:</b> Understand causes and effects of sea level changes and global warming <b>CO7:</b> Understand the concept of CRZ <b>CO8:</b> Understand the concept of coral formation, distribution and threats
17	GEG-E11	Geography of Rural Settlements	At the end of this course, students will be able to: <b>CO6:</b> Appreciate the role of topography and climate in shaping rural landscape <b>CO7:</b> Understand the dynamics of fringe settlements <b>CO8:</b> Evaluate the spatial organization of rural settlements <b>CO9:</b> Analyze the impact of urbanization on rural settlements (any two case studies) <b>CO10:</b> Infer the internal morphology of villages (any two case studies)
18	GEG-E12	Geography of Urban Settlements	At the end of this course, students will be able to: <b>CO8:</b> Understand the various concepts of urbanization, urban systems, functions of urban places, site and situation <b>CO9:</b> Understand certain issues of urban development. <b>CO10:</b> Apply urban theories and models in the present day context. <b>CO11:</b> Apply basic tools in demographic, urban hierarchy and ranking of urban settlement <b>CO12:</b> Using tools of urban geography, conduct mini research of town or city. <b>CO13:</b> Demonstrate urban network using $\alpha$ , $\beta$ , $\gamma$ index. <b>CO14:</b> Create graphical representations of hierarchy of settlements using rank size rule and primate city concept.
19	GEG-VI.C8	Geography of Population Growth	At the end of this course, students will be able to: <b>CO7:</b> Understand the determinants of population growth <b>CO8:</b> Analyze world population patterns of distribution and

			<p>growth trends.</p> <p><b>CO9:</b> Calculate fertility, mortality, density of population.</p> <p><b>CO10:</b> Correlate population characteristics among LDC and MDC.</p> <p><b>CO11:</b> Evaluate family welfare programmes in India.</p> <p><b>CO12:</b> Graphically represent population trends and projections in LDC &amp; MDC</p>
20	GEG-E13	Introduction to Regional Planning	<p>At the end of this course, students will be able to:</p> <p><b>CO5:</b> Gain knowledge of basic concepts in regional planning from a geographer's perspectives</p> <p><b>CO6:</b> Understand the concept of Regional Planning and its variations across time and space</p> <p><b>CO7:</b> Correlate and distinguish various types of regional planning and apply the same to the local settings.</p> <p><b>CO8:</b> Delineate formal, functional and planning regions</p>
21	GEG-E14	Fundamentals of Economic Geography	<p>At the end of this course, students will be able to:</p> <p><b>CO5:</b> Gain insights into the concepts and theoretical approaches in Economic Geography.</p> <p><b>CO6:</b> Understand and apply theories and models of economic geography in present day context</p> <p><b>CO7:</b> Apply and compare the global economic patterns with local economic scenarios</p> <p><b>CO8:</b> Collect and analyze the spatial data of economic and commercial establishments to determine spatio-temporal changes</p>
22	GEG-E15	Geography of Tourism	<p>At the end of this course, students will be able to:</p> <p><b>CO6:</b> Understand the concepts of travel and tourism.</p> <p><b>CO7:</b> Analyze the role of geographic factors in tourism development</p> <p><b>CO8:</b> Evaluate the socio-cultural, economic and environmental factors and their impacts on tourism (any two case studies)</p> <p><b>CO9:</b> Evaluate the tourism development in Goa (historical to present)</p> <p><b>CO10:</b> Analyze the challenges of tourism industry in Goa</p>
23	GEG-E16	Quantitative Techniques in Geography	<p>At the end of this course, students will be able to:</p> <p><b>CO6:</b> Acquire knowledge of drawing inferences using the geographical database</p> <p><b>CO7:</b> Develop an understanding and appreciation of the mutual dependence of different techniques and their relevance.</p> <p><b>CO8:</b> Formulate and test the hypothesis</p> <p><b>CO9:</b> Use of open source software for Statistical analysis</p> <p><b>CO10:</b> Estimate and predict trends and patterns of geographical phenomena.</p>