

Syllabus for Under Graduate Course

Undergraduate Course in Geography

(Bachelor of Arts/Science)

Under

Choice Based Credit System

With Course Rationale and Learning Based Outcomes



2020 - 2023

School of Geography

Gangadhar Meher University

Sambalpur-768004



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School of Geography

Gangadhar Meher University
Amruta Vihar, Sambalpur -768004

Preamble

Gangadhar Meher University (GMU), Sambalpur was established on 30th May 2015, which has already been a sought-after higher education institution (Gangadhar Meher College, established 1944) in the Western Odisha. The university has seen – *‘several generations of men and women of all hues, all the children of the eternal mother [...] not just the nascent decades of post independent India but the eager and aspirational youth of the new millennial Odisha’*¹. It excels in the region in educating in all regular scientific streams such as Science, Commerce and Arts as well as professional courses such as business administration. The university approved by University Grant Commission (UGC) and has been accredited as ‘A’ by National Assessment and Accreditation Council (NAAC). The institutes provides Undergraduate (UG), Postgraduate (PG), Masters of Philosophy (M.Phil. until 2021) and Doctor of Philosophy (Ph.D.) programme in various disciplines covering Science, Arts, Commerce, Information Science and Management.

Among many disciplines being taught in the GM University, Geography is one core subject that is being offered under both Science and Arts Streams by the university.

Geography in GM University

Introduction

Geography is the study of Earth and Man and their interrelationships covering both natural and human environments. It studies places and people and their relationships within and between. Geographers investigate both the physical characteristics of Earth's surface and the human societies spread across the globe (National Geographic Society, 2023). Students, by opting for the geography as major during the undergraduate programme, discover about the features and process on Earth surface as well as their interaction with humans exploring – how these interactions impact their environments and shapes the humanity.

The university has Postgraduate department of Geography that operates under Faculty of Earth and Environmental Sciences. The institute provides Bachelors of Arts/Science (B.A./B.Sc.) in Geography [Honours], Bachelors of Education in Geography [Honours], Masters of Arts/Science (M.A./M.Sc.) in Geography and Doctor of Philosophy (Ph.D.) in Geography.

The School of Geography

School of Geography (the then department of Geography), established in 1964, has been an essential department of the institution and conducted UG and PG courses since then providing Bachelors of Arts (B.A) and Master of Arts (M.A.) in Geography. After the establishment of GM University in 2015, M. Phil. and Ph.D. programmes were introduced in

¹ Prof. N Nagaraju, Hon'ble Vice-Chancellor, GM University (2020-).

the department from 2018. The M. Phil. Programme continued until 2021 and was stopped being offered as UGC discontinued the degree in 2021. During this period, ten scholars have been awarded M.Phil. Degree in Geography. Under the Doctor of Philosophy (Ph.D.) programme in Geography, 2 scholars have been awarded PhD while 13 scholars are continuing their doctoral research in various stages covering both physical and social dimensions of Geography. Since 2021, the department is offering B.Sc. in Geography [Honours] while M.Sc. in Geography is being offered since 2022.

Thereby, at present, the School of Geography is offering both B.A. and B.Sc. in Geography [Honours] and Integrated B.Ed. in Geography under its undergraduate programme; M.A. and M.Sc. in Geography under its postgraduate programme; and, Ph.D. in Geography under its research programme.

The School of Geography at GMU put its efforts to educate students in academic and professional skills and aids them in growing as capable and thoughtful geographers. We prepare our students to contribute well in nurturing the discipline as well as people around them and world at large. Students of our department have achieved various milestones and are placed in various institutions in Odisha and beyond.

Vision and Mission of the School of Geography

With the intention to keep the traditional and noble roots intact, the school offers has following vision and missions:

Vision

The School of Geography envisions becoming a leading centre of teaching and research in spatial sciences in India by preparing its students as productive citizens through relevant education and harnessing the integrative nature of geography as a discipline to promote sustainable development through research.

Missions

School of Geography, GMU is committed to achieve its vision through measurable actions in the form of following mission:

1. To produce and disseminate new geographical knowledge and insights on key environmental, socio-cultural and economic issues.
2. To undertake cutting-edge geographical research applying relevant tools and techniques including Remote sensing (RS) and Geographic Information (GIS) to answer fundamental questions of local, national and global importance.
3. To provide students with effective and relevant theoretical and practical knowledge necessary for professional development.
4. To orient students to think critically and to celebrate diversity as global citizens by realizing their own place, values and responsibilities to other people, to the environment and to earth's sustainability.

Resources in the School of Geography

Faculties and Support Staffs

At present, the department has four permanent faculties: 1 Professor, 2 Associate Professor and 5 Assistant Professor (all PhD holders from reputed institutions in India and Abroad). They have sizable experiences in wide-ranging and evolving geographical field covering natural as

well as social sciences (particularly Geo-informatics, Natural resource management, Disaster management, Hydrology, Development studies, Socio-cultural geography, Population studies and Public health).

Furthermore, the department is supported 1 lab-assistant and 1 lab-associate as well as by guest faculties as and when required. Research Scholars in the department also contribute in the department wherever opportunity arises for them.

Practical Facilities

The department has two practical labs (1 for PG and 1 for UG), which are also used for classes. There are various instruments specific for the practical classes of Geography such as Geography Practical Tables, Light Tables and Geometric instruments (various sizes), Specific Pens (e.g. Rottering), Scales and Stereoscopes. The department has range of Toposheet, Aerial Images and Satellite images. The department is also supported by a Departmental Library, Store Room and a Research Scholars' room.

Undergraduate (UG) in Geography – Specification

Introduction – BA/BSc in Geography

Our UG curriculum deals with man and earth covering different associated phenomena and features. These programs are structured to provide dedicated training in many geography centric areas covering training in both descriptive and analytical skills. Our undergraduate program (B.A. and B.Sc. in Geography) is suitable for students, who pursue an innate understanding of man's role (economic, social, and political) in the world. The subject 'Geography' is broadly divided in two domains Physical Geography and Human Geography covering various specialized areas such as geomorphology, cartography, climate, oceans, population, society, culture, economy, resource, environment, settlement and regional studies. The students could opt for electives from Science or Arts Stream as per their inclination towards the Physical or Human Geography. Further, due to the evolving world affairs, Geography has been rapidly evolving significantly in current interdisciplinary era and encompasses newer fields such as Climate Change, Global Health and Sustainable Resource Management. Therefore, to cover this evolving side of Geography, the School of Geography includes these contemporary topics in its lectures, tutorials and practical classes at UG level while offers full-fledged elective courses on some of the contemporary topics at PG Level.

Aims and Objectives of UG programme in Geography

Aim

The undergraduate program in Geography at GMU aims to educate Geography to undergraduate students following a standard and concrete educational framework [Outcome Based Learning (OBL) Framework, as required by UGC and NAAC], around which, the subject of Geography is well spaced and paced – assisting students to conveniently grapple and absorb the university-level learnings in Geography with focus on employability, entrepreneurship and skill development of the students.

Objectives

To fulfil its aim, the undergraduate curriculum of Geography (Hons) intends to –

1. Educate students in conceptual frameworks with in the different facets of geography covering both physical and human side of the discipline.
2. Acquaint the students in identification and analysis of various geographic specialities covering range of features and processes involved.
3. Encourage students to acquire at least basic abilities, on individual as well as team levels, to carry out geographic field work.
4. To assist students to learn the science and art of collecting, processing and interpreting the geographic data.
5. To facilitate cartographic skills to the students.
6. Guide students to visualise geographic space as well as the geographic concepts at different scales.
7. Make students acquaint with latest spatial tools and techniques (such as Remote Sensing and Geographic Information System).

Outcome – Based Learning (OBL) Approach in UG curriculum for Geography

OBL Structure

GM University follows OBL approach as its educational framework, which uses goals (outcomes) that need to be achieved by each student by the end of their programme after following the curriculum². The approach intends for the holistic development of the students through opportunities to explore the real world using various ways such as field work and extension outreach activities. It facilitates a format of courses designed to develop strong subject knowledge to keep the students aware of different sides of the subject. Subsequently, the OBL based syllabus focuses on skill development and employability of the students. It promotes structural uniformity within the curriculum of different disciplines as well as with the curriculums of same subject across universities of the country.

The OBL based curriculum delineates Programme Outcomes (POs) at the University Level, Programme Specific Outcomes (PSOs) and Course Outcomes (COs) for each courses run in the department at the Department level. These POs, PSOs and COs of the curriculum should be connected and could be mapped in the students' performance in their assessments (e.g. examination, assignments etc.).

OBL in UG Geography at GMU

Geography is scientific-based and society-oriented that focuses on spatio-temporal analyses. OBL based curriculum for the UG programme of Geography allows UG students to:

- understand the developmental journey of Geography as subject;
- explore and excel in various concepts, theories and frameworks associated with the different aspects of this discipline through range of papers covering both physical and human side of Geography; and,
- learn effortlessly and deal with the contemporary issues of the world.

Thus, our OBL based UG curriculum focuses in helping the students to recognize the latest spatial tools and techniques, which would be helpful for the formation of their geographical understanding of this world. It assists the students to perceive, create and evaluate sound geographical constructs and concepts.

² NAAC Institutional Accreditation Manual for Self-study Report, 2020

Our curriculum also focuses on local concerns and has been cultivated in light of addressing the needs and expectations of the local and regional students from wide range of academic as well as personal backgrounds. It is designed as student centric and our teaching and learning process is strengthened by covering global to local issues and examples. The curriculum covers essential concepts of both physical and human domains of Geography along with suitable tools and techniques.

Thereby, in our school of Geography, our proposed PSOs and COs for each course in UG Programme for Geography have been adapted and reframed as per our aim and objectives of the programme and within the scope of resources available to the school.

Choice Based Credit System (CBCS): Curriculum for UG Geography in GMU

Syllabus aligned with the graduate attribute in Geography by UGC

BA/BSc in Geography is a three-year undergraduate course under the *Choice Based Credit System (CBCS)* organised as – Core Courses, Skill Enhancement Course, Elective - Discipline Specific and Elective - Generic Courses. The core courses span over critical field within Geography that needs to be studied for basic geographical knowledge. This syllabus is aligned with the graduate attribute in Geography outlined by UGC (University Grant Commission, India) described as below:

- A. Theory – covers theoretical and conceptual fundamentals of geography.
- B. Practical – spans over spatial Statistical Techniques, RS, GIS, Research Methods and Geographical Fieldwork
- C. Regional coverage – covers World Geography, Geography of India, Geography of different states
- D. Application Oriented – includes application-based courses such as disaster management and Environmental Geography etc.

Each Course has one aim, minimum four COs, four units and reading list including books on regional languages wherever possible.

Pedagogy

Our pedagogy process includes:

- Lectures and tutorials and Practical classes
- Assignments (individual and group)
- Case studies
- Field work
- Team work
- Presentation of learning through various means (report to power points to any other creative methods such as posters and flyers)
- Scientific reading and writing as well as scientific communication
- Academic and practical world interface
- Extension/ Outreach activities to benefit society

Evaluation

Our teaching and evaluation framework intend to:

1. Periodic review of course, teaching resources and methods as well as the performance of students;

2. Encourage students for critical and creative thinking;
3. Realisation of learning outcomes all courses in Geography;
4. Maintain the teaching standards to its best; and,
5. Confirmation of students' Geography specific as well as overall graduate attributes.

Learning Outcomes

Our programme focuses on following distinct and major learning outcomes:

- Realise the significance of geographical information overall as well as its implications in day to day lives.
- Able to communicate geographic information.
- Could evaluate and resolve geographical problems in effective manner.
- Could use geographical research tools such as cartography, spatial statistics, RS and GIS efficiently and effectively.
- Should be able to understand the contemporary spatial issues pertaining to all scale ranging from local to global levels and figure out apt and sensible solutions.

Graduate Attributes of Aspired Geographers

We, at GMU, aspire students to cultivate specific graduate attributes suitable to Geographers through the Programme Specific Outcomes (PSOs) of our UG programme in Geography. These PSOs map to the Programme out for UG in GMU. They are discussed below:

Programme Specific Outcomes (PSOs) of UG in Geography in GMU

The department has delineated following PSOs to [cultivate Geography graduates at par with national and international benchmarks:](#)

- PSO 1. Core Competency** – Geography undergraduates will appreciate the interactions among man and environment using various quantitative and qualitative methods at local, regional and global scales.
The students of BA Geography will have special understanding of the fundamental spatial concepts associated the man and the earth and the exchanges between them that shapes our Earth and Society. They would explore the realm of social sciences while navigating through Geography.
The students of BSc Geography will have technical perspectives associated the man and the earth and the exchanges between them that shapes our Earth and Society. They would explore the realm of core sciences while navigating through Geography.
- PSO 2. Scientific and Spatial Thinking** – Students will be able to observe, analyse, interpret and draw conclusion based on qualitative and quantitative geographical evidences and methods. Being spatial science, scientific thinking in Geography will equip students with spatial thinking. Spatial thinking will encourage the students to think spatially while resolving their personal and professional issues, making more informed decisions.
- PSO 3. Analytical thinking** – The students will analyse spatial– and temporal– patterns and trends of geographical information in order to utilise the outcome for personal and professional use. They will be able to outline the role of spatial knowledge in resolving the problem.
- PSO 4. Critical Thinking** – Geography undergraduates will be able to think critically, derive conceptual frameworks as and when required, contemplate on scientific methodology, and construct convincing scientific opinions. They will critically be able

to evaluate data, methods and outcomes. They shall also be aware of the various biases and logical errors in this process.

- PSO 5. Problem solving** – Geography graduates will be armed with range of geographical approaches required to understand and resolve any problem faced by mankind within the subject's ambit, be it at local, regional or global scales.
- PSO 6. Research skills** – Geographers will become attentive towards the patterns and trends across space and time, which could enable them to foresee problems and opportunities at all scales on the Earth. Their geographical understanding of past to present happenings on earth could be highly useful to resolve contemporary and future concerns on this planet.
- PSO 7. Teamwork** – Geographers will be able to work individually as well as in team. As the subject is interdisciplinary, it encourages students for team work.
- PSO 8. Communication Skills** – Geography undergraduates will specialize in graduate level communication particularly in spatial communication (mapping). They shall be able to read and comprehend the academic literature available in Geography, perform in-depth assessment (including spatial analysis) and derive logical explanations based on geographical approaches. They shall be able to communicate their idea or findings in coherent manner to broader audiences.
- PSO 9. Digital Literacy** – Students will use multi-facet technologies such as Geographical Information Systems and spatial modelling to assess and solve their concerns. They will also enrich themselves through the learning available in form of e-courses and MOOCs on various government platforms.
- PSO 10. Sustainable development** – Geography undergraduates will obtain fundamental geographical proficiencies to understand and work for the environments surrounding them, be it natural or human. They will be able to take evidence based decisions for sustainable planning and management of their personal and professional resources.
- PSO 11. Ethical Awareness** – Geography undergraduates will become aware of ethics and values required in the discipline, in the academia and in the world at large. They shall also beware of plagiarism and scientific misconduct.
- PSO 12. Leadership** – Geography undergraduates will become acquainted of spatial decision-making process and they will be able to use this understanding to take lead, as and when required.
- PSO 13. Multi-cultural competence** – The students will explore multi-cultural aspects through the humane side of Geography, which will assist them in gaining better understanding of the society and becoming more useful to it.

Semester	GMU Students	Paper Code	Courses run in the department	PSO-01	PSO-02	PSO-03	PSO-04	PSO-05	PSO-06	PSO-07	PSO-08	PSO-09	PSO-10	PSO-11	PSO-12	PSO-13	
			Programme Specific Outcomes (PSOs) →	Core Competency	Analytical thinking	Scientific Thinking	Critical Thinking	Problem solving	Research skills	Teamwork	Communication Skills	Digital Literacy	Sustainable Development	Ethical Awareness	Leadership	Multicultural competence	
I	Geographers	CC-I	Geomorphology	Y	Y	Y	Y	Y	-	Y	-	Y	Y	Y	Y	-	
		CC-II	Cartography	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Non-Geographers	GE-I	Geography of India	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	
II	Geographers	CC-III	Human Geography	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
		CC-IV	Climatology	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	-
	Non-Geographers	GE-II	Geography of Odisha	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
III	Geographers	CC-V	Oceanography	Y	Y	Y	Y	Y	Y	-	-	Y	Y	Y	-	Y	
		CC-VI	Statistical Methods in Geography	Y	Y	Y	Y	Y	Y	-	-	Y	Y	Y	-	-	
		CC-VII	Geography of Odisha	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Non-Geographers	GE-III	Climatology	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	-	
IV	Geographers	CC-VIII	Evolution of Geographical Thought	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	
		CC-IX	Economic Geography	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		CC-X	Environmental Geography	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		SEC-II	Research Methods in Geography	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Non-Geographers	GE-IV	Human Geography	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
V	Geographers	CC-XI	Regional Planning and Development	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	
		CC-XII	Remote Sensing & GIS	Y	Y	Y	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y
		DSE-I	Population Geography	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		DSE-II	Resource Geography	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VI	Geographers	CC-XIII	Geography of India	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
		CC-XIV	Disaster management	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		DSE-III	Urban Geography	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		DSE-IV	Dissertation/ Project Work	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
			Note:	Core courses		General Elective		Skill Enhancement Course			Discipline Specific Elective						

Figure 1 - The Undergraduate Courses taught in the School of Geography, GMU together with their associated PSOs

Semester	GMU Students	Paper Code	Courses run in the department	Course Outcome (CO)	PSO-01	PSO-02	PSO-03	PSO-04	PSO-05	PSO-06	PSO-07	PSO-08	PSO-09	PSO-10	PSO-11	PSO-12	PSO-13		
			<i>Programme Specific Outcomes (PSOs) →</i>		<i>Core Competency</i>	<i>Analytical thinking</i>	<i>Scientific Thinking</i>	<i>Critical Thinking</i>	<i>Problem solving</i>	<i>Research skills</i>	<i>Teamwork</i>	<i>Communication Skills</i>	<i>Digital Literacy</i>	<i>Sustainable Development</i>	<i>Ethical Awareness</i>	<i>Leadership</i>	<i>Multicultural competence</i>		
<i>1 - Slightly Related; 2- Moderately Related; 3 - Strongly Related</i>																			
					Note:		Core courses			General Elective			Skill Enhancement Course			Discipline Specific Elective			
I	Geographers	CC-I	Geomorphology		Y	Y	Y	Y	Y	-	Y	-	Y	Y	Y	Y	-		
				CO-01	3	2	3	2	3						2				
				CO-02	3	2	3	2	3		2					2			
				CO-03	3	2	3	2	3						3	2			
	CO-04	3	2	3	2	3		2			3	3	2	1					
	Geographers	CC-II	Cartography		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
				CO-01	3	3	3	3	3	1		3	1	1	3				
				CO-02	3	3	3	3	3	1		3			3				
				CO-03	3	3	3	3	3	2	2	3	3	2	3	2	3	2	1
	CO-04	3	3	3	3	3	2	2	3	3	2	3	2	3	2	2			
	Non-Geographers	GE-I	Geography of India		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	
				CO-01	3	3	3	1	1	1				1		2		1	
CO-02				3	3	3	1	2	1				1		2		1		
CO-03				3	3	3	2	3	1	1	1	1	2	2			2		
CO-04	3	3	3	2	3	2	1	1	2	2	2			2					
II	Geographers	CC-III	Human Geography		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
				CO-01	2	2	2	2						1	2		2		
				CO-02	3	3	3	3	3	1	3		3	1	2	1	3		
				CO-03	3	3	3	3	3	2	3				2		3		
	CO-04	3	3	3	3	3	2	3	1			2	2	1	3				
	Geographers	CC-IV	Climatology		Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	-		
				CO-01	3	3	3	3	3					1	1	2			
				CO-02	3	3	3	3	3						1	2			
				CO-03	3	3	3	3	3	1				1	2	1			
	CO-04	3	3	3	3	3	2	1			2	2	2	2					
	Non-Geographers	GE-II	Geography of Odisha		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
				CO-01	3	3			1					1	2		1		
CO-02				3	3	2	2	2	1				1	2		1			
CO-03				3	3	2	2	2	1	1		1	1	2	1				
CO-04	3	3	2	2	2	1			1		1	2	1						

Figure 2 - The Undergraduate Courses taught in the School of Geography, GMU together with their associated COs and PSOs during Semester I and II

Semester	GMU Students	Paper Code	Courses run in the department	Course Outcome (CO)	PSO-01	PSO-02	PSO-03	PSO-04	PSO-05	PSO-06	PSO-07	PSO-08	PSO-09	PSO-10	PSO-11	PSO-12	PSO-13		
			Programme Specific Outcomes (PSOs) →		Core Competency	Analytical thinking	Scientific Thinking	Critical Thinking	Problem solving	Research skills	Teamwork	Communication Skills	Digital Literacy	Sustainable Development	Ethical Awareness	Leadership	Multicultural competence		
1 - Slightly Related; 2 - Moderately Related; 3 - Strongly Related																			
					Note:		Core courses		General Elective		Skill Enhancement Course			Discipline Specific Elective					
III	Geographers	CC-V	Oceanography	CO-01	3	3	3	1	2	1	-	-	2	1	2	-	1		
				CO-02	3	3	3	1	2					2	2				
				CO-03	3	3	3	2	3					2	2				
				CO-04	3	3	3	2	3	1					3	2			1
	Geographers	CC-VI	Statistical Methods in Geography	CO-01	3	3	3	1	3	1				2		2			
				CO-02	3	3	3	2	3	1				2		2			
				CO-03	3	3	3	2	3	2						2			
				CO-04	3	3	3	3	3	2				3	1	2			
	Geographers	CC-VII	Geography of Odisha	CO-01	3	3			1			Y	Y	Y	Y	Y	Y	Y	
				CO-02	3	3	2	2	2	1					1	2		1	
				CO-03	3	3	2	2	2	1	1			1	1	2	1		
				CO-04	3	3	2	2	2	1			1		1	2	1		
	Non-Geographers	GE-III	Climatology	CO-01	3	3	3	3	3					1	1	2			
				CO-02	3	3	3	3	3					1	2				
				CO-03	3	3	3	3	3	1				1	2	1			
				CO-04	3	3	3	3	3	2	1			2	2	2	2		
IV	Geographers	CC-VIII	Evolution of Geographical Thought	CO-01	2	1	1			1		1		1	2		1		
				CO-02	2	1	1	1	1	1			1		2				
				CO-03	3	3	3	3	3	1			2		2		1		
				CO-04	3	3	3	3	3	2	1	2			1	2	2		
	Geographers	CC-IX	Economic Geography	CO-01	2	2	2	2	1						1	2		1	
				CO-02	3	3	3	3	3	2				1	1	2			
				CO-03	2	2	2	2	2						1	2	1	1	
				CO-04	3	3	3	3	3	2			1	1	1	2	2	1	
	Geographers	CC-X	Environmental Geography	CO-01	2	2	2	2	2	1					1	2		1	
				CO-02	3	2	2	2	2					2	2				
				CO-03	3	3	3	3	3	2			1	2	2	2	1		
				CO-04	3	3	3	3	3	2	1	2			3	2	2	1	
	Geographers	SEC-II	Research Methods in Geography	CO-01	2	3	3	3	3	3					3	1	3	2	1
				CO-02	2	3	3	3	2	3					1	1	3		
				CO-03	3	2	2	2	2	3	2	2			2	1	3		
				CO-04	3	3	3	3	3	3	2	3	2	3	2	2	3	2	1
Non-Geographers	GE-IV	Human Geography	CO-01	2	2	2	2							1	2		2		
			CO-02	3	3	3	3	3	1	3			3	1	2	1	3		
			CO-03	3	3	3	3	3	2	3					2			3	
			CO-04	3	3	3	3	3	2	3	1				2	2	1	3	

Figure 3 - The Undergraduate Courses taught in the School of Geography, GMU together with their associated COs and PSOs during Semester III and IV

Semester	GMU Students	Paper Code	Courses run in the department	Course Outcome (CO)	PSO-01	PSO-02	PSO-03	PSO-04	PSO-05	PSO-06	PSO-07	PSO-08	PSO-09	PSO-10	PSO-11	PSO-12	PSO-13		
			<i>Programme Specific Outcomes (PSOs) →</i>		<i>Core Competency</i>	<i>Analytical thinking</i>	<i>Scientific Thinking</i>	<i>Critical Thinking</i>	<i>Problem solving</i>	<i>Research skills</i>	<i>Teamwork</i>	<i>Communication Skills</i>	<i>Digital Literacy</i>	<i>Sustainable Development</i>	<i>Ethical Awareness</i>	<i>Leadership</i>	<i>Multicultural competence</i>		
<i>1 - Slightly Related; 2 - Moderately Related; 3 - Strongly Related</i>																			
					Note:		Core courses			General Elective			Skill Enhancement Course			Discipline Specific Elective			
V	Geographers	CC-XI	Regional Planning and Development	CO-01	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y		
				CO-02	2	2	2	2	2			1	1	2	2				
				CO-03	3	3	3	3	3					1	2	2	1		
				CO-04	3	3	3	3	3	2	1			2	2	2	1		
	Geographers	CC-XII	Remote Sensing & GIS	CO-01	Y	Y	Y	Y	Y	Y	Y	-	-	Y	Y	Y	-	Y	
				CO-02	3	3	3	3	3					2	1	2			
				CO-03	3	3	3	3	3	2				2	2	2	1		
				CO-04	3	3	3	3	3	2				2	2	2	1		
	Geographers	DSE-I	Population Geography	CO-01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
				CO-02	2	2	2	2	2	2					1	2	1		
				CO-03	3	3	3	2	2	2				1	1	2	1		
				CO-04	3	3	3	3	3	2	1	1		2	2	2	2		
	Geographers	DSE-II	Resource Geography	CO-01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
				CO-02	2	2	2	2	2					1	2	1			
				CO-03	3	3	3	2	3	2				1	2	2	1		
				CO-04	3	3	3	3	3	2	1	1		2	2	2	2		
VI	Geographers	CC-XIII	Geography of India	CO-01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
				CO-02	3	3	3	1	1	1			1		2	1			
				CO-03	3	3	3	2	3	1	1	1	1	2	2	1	2		
				CO-04	3	3	3	2	3	2	1	1	2	2	2	2			
	Geographers	CC-XIV	Disaster management	CO-01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
				CO-02	3	3	3	1	3						2				
				CO-03	3	3	3	2	3	1	1	1		2	2	2	2		
				CO-04	3	3	3	3	3	2	1	1	1	2	2	2			
	Geographers	DSE-III	Urban Geography	CO-01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
				CO-02	2	2	2	1	2					1	1	2	2		
				CO-03	3	3	3	1	3	1				1	1	2	2		
				CO-04	3	3	3	2	3	2	1			2	2	2	2		
Geographers	DSE-IV	Dissertation/ Project Work	CO-01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
			CO-02	2	3	3	3	3	1				1		3	1			
			CO-03	2	3	3	3	3	3				2	1	3				
			CO-04	3	3	3	3	3	3	3	2	3	2	3	1	2			

Figure 4 - The Undergraduate Courses taught in the School of Geography, GMU together with their associated COs and PSOs during Semester V and VI

PSOs mapping to POs of GMU

Following table map the PSOs delineated in the department to PO of UG Programme in the GMU –

Table 1 - Mapping of PSOs in School of Geography to POs in GMU

		PO-01	PO-02	PO-03	PO-04	PO-05	PO-06	PO-07
		Critical Thinking	Effective Communication	Social Interaction	Effective Citizenship	Values and Ethics	Environment and Sustainability	Self-directed and Life-long Learning
PSO-01	Core Competency	√	√	√			√	√
PSO-02	Analytical thinking	√			√		√	√
PSO-03	Scientific Thinking	√					√	√
PSO-04	Critical Thinking	√			√		√	√
PSO-05	Problems solving	√			√		√	√
PSO-06	Research skills	√		√	√		√	√
PSO-07	Teamwork		√	√	√	√	√	√
PSO-08	Communication Skills		√	√	√	√	√	√
PSO-09	Digital Literacy			√			√	√
PSO-10	Sustainable Development	√	√	√		√	√	√
PSO-11	Ethical Awareness		√	√	√	√	√	√
PSO-12	Leadership	√	√	√	√	√	√	√
PSO-13	Multicultural competence	√		√	√		√	√

Qualification Descriptors (QD) for B.A./B.Sc. (Hons.) Programme

The QD for the B.A./B.Sc. (Hons.) programme in Geography shall cover the geographical learning attributes such as core geographical knowledge, field knowledge and use of advance spatial and allied tools and techniques for better comprehension of space and society etc. It shall also involve awareness among the students about the socio-cultural aspects as well as concerns from varied regions.

The main QD for the students of B.A./B.Sc. (Hons.) in geography is to develop the critical evaluation and understanding of geographical information. Each Geography (Hons.) student shall be able to;

- 1) Exhibit geographical knowledge scientifically covering both the theoretical as well as practical aspects of the subject.

- 2) Shows the ability to demonstrate the significance of geography in enhancing regional development and reducing regional inequalities.
- 3) Think critically on geographical aspects at spatial and temporal scales, identify nominal to critical concerns and propose solutions
- 4) Demonstrate the ability to use the geographical knowledge acquired in the class in real world.
- 5) Comprehend the scope of geography in terms of exploring the career opportunities, employment and life-long engagement.
- 6) Utilise the learnings to contribute towards the sustainable development of oneself and everyone else around.

Through the theoretical and practical means of geography, the students will also develop the ability to realise the Sustainable Development Goals (SDG) altogether by indirect or direct participations.

Undergraduate (UG) in Geography – Syllabus in detail

The following section contain detailed syllabus followed in the School of Geography at GM University, Sambalpur with following components based on CBCS as discussed above:

1. Core Courses (CC)
2. Discipline Specific Elective (DSE)
3. General Elective (GE) offered by the department
4. Skill Enhancement Course (SEC)

**STATE MODEL SYLLABUS FOR UNDER GRADUATE
COURSE IN GEOGRAPHY
(Bachelor of Arts Examination)**

**UNDER
CHOICE BASED CREDIT SYSTEM**

2020 - 2023

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Geography (Honors)

Table 3: Undergraduate in Geography (Hon.) - Course Summary

Semester		CORE COURSE (14)	Ability Enhancement Compulsory Course (AECC) (2)	Skill Enhancement Elective Course (AECC) (2) (Skill Based)	Elective: Discipline Specific DSE (4)	Elective: Generic (GE) (4)
I	CC1	Geomorphology	English Communication/ Odia/ Hindi			GE-I Geography of India
	CCII	Cartography				
II	CCIII	Human Geography	Environmental Studies			GE-II Geography of Odisha;
	CCIV	Climatology				
III	CCV	Oceanography		SEC -I Communicative English and English Writing		GE-III Climatology
	CCVI	Statistical Methods in Geography				
	CCVII	Geography of Odisha				
IV	CCVIII	Evolution of Geographical Thought		SEC II University Option		GE- IV Human Geography
	CCIX	Economic Geography				
	CCX	Environmental Geography				
V	CCXI	Regional Planning and Development			DSE-I [A] Population Geography; Or,	
	CCXII	Remote Sensing & GIS			DSE -II Resource Geography	
VI	CCXIII	Geography of India			DSE –III Urban Geography	
	CC XIV	Disaster management			DSE – IV or Dissertation/ Project Work	

Geography (Honors)

Core course – 14 papers, Discipline Specific Elective – 4 papers

Generic Elective for Non Geography students – 4 papers.

Incase University offers 2 subjects as GE, then papers 1 and 2 will be the GE paper.

Marks per paper - Midterm: 15 marks, End term : 60 marks, Practical:25 Total – 100 marks;

Credit per paper – 6; Teaching hours per paper – 50 hours + 10 hours tutorial;

The detail syllabus for undergraduate in Geography is as follows.

Core Courses

CC - I: Geomorphology

Course Objectives

This course is designed to study of landforms, their processes, form and sediments at the surface of the Earth. It provides a landscape platform to develop practices to understand how the natural world looks.

Course Outcomes (COs)

The students will be able to:

- CO-01: Assess the internal and external structure and functioning of the Earth (OBE Level: Analyze)
- CO-02: Evaluate different movements of Earth and associated theories (OBE Level: Evaluate)
- CO-03: Examine Geomorphic Processes and associated theories to understand the overall functions and process going on Earth surface (OBE Level: Evaluate)
- CO-04: Evaluate the processes and outcomes of Geomorphic agents and landforms (OBE Level: Evaluate)

Course-work

Unit - I: Geomorphology: Meaning, Nature & Scope, Internal Structure of the Earth, Isostasy (Airy and Pratt's view), Rocks-Types and Characteristics, Types of Folds and Faults

Unit - II: Earth Movements: Continental Drift, Plate Tectonics, Earthquakes and Volcanoes (Types, distribution and associated Landforms). Geosynclinal theory and stages of mountain building and Convection current theory.

Unit - III: Geomorphic Processes: Types & characteristics of Weathering & Mass Wasting, Cycle of Erosion & evolution of Landforms of Davis and Penck's evolutionary theory).

Unit - IV: Geomorphic agents and landforms : (Erosional and Depositional landforms of Fluvial, Karst, Aeolian, Glacial and Coastal origin)

Practical

1. Drawing of relief features using contour lines-Mountain, Plateau, valleys, escarpments and their profiles, construction and use of serial, projected and super-imposed profiles,
2. Use of Planimeter and Rotameter in measurements on maps, Longitudinal and transverse profile of a river, Drainage Pattern and drainage Density

3. Interpretation of simple geological Maps (Introducing the concepts of Dip, Strike, Bedding Plane, Unconformity, Dykes, Folds and Faults).
4. Practical Record and Viva-voce (10 marks)

Reading Materials

Text Book

1. Singh, S (2009): Physical Geography , Geomorphology, Prayag Pustak Publications , Allahabad

Reading List:

- Bloom A. L., 2003: Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, New Delhi.
- Bridges E. M., 1990: World Geomorphology, Cambridge University Press, Cambridge.
- Christopherson, Robert W., (2011), Geosystems: An Introduction to Physical Geography, 8 Ed., Macmillan Publishing Company
- Kale V. S. and Gupta A., 2001: Introduction to Geomorphology, Orient Longman, Hyderabad.
- Knighton A. D., 1984: Fluvial Forms and Processes, Edward Arnold Publishers, London.
- Richards K. S., 1982: Rivers: Form and Processes in Alluvial Channels, Methuen, London.
- Selby, M.J., (2005), Earth's Changing Surface, Indian Edition, OUP
- Skinner, Brian J. and Stephen C. Porter (2000), The Dynamic Earth: An Introduction to physical Geology, 4th Edition, John Wiley and Sons
- Thornbury W. D., 1968: Principles of Geomorphology, Wiley.
- Gautam, A (2010): Bhautik Bhugol, Rastogi Publications, Meerut
- Tikkaa, R N (1989): Bhautik Bhugol ka Swaroop, Kedarnath Ram Nath, Meerut
- Singh, S (2009): Geomorphology, Prayag Pustak Bhawan, Allahabad.
- Steers, J. A. – Unstable Earth, Kalyani Publisher

CC - II: Cartography

Course Objectives:

This course is designed to provide the comprehensive knowledge and skills to understand the process of map making. It aims to assist students in making maps to represent geographical information.

Course Outcomes (COs)

The students will be able to:

- CO-01: Showcase a comprehensive understanding of basics for Map-making (OBE Level: Understand).
- CO-02: Gain a Comprehensive understanding of basic geodesy required for map-making (OBE Level: Apply)
- CO-03: Use the techniques and principles of map making and designing (OBE Level: Analyze)
- CO-04: Read and assess various maps (e.g. slope and geology) (OBE Level: Evaluate)

Course Work

Unit - I: Cartography-Nature and scope

- (a) Scientific basis of Cartography, needs of map making, characteristics of maps,
- (b) Cartography as a science of human communication
- (c) Branches of Cartography, Scope of cartography

Unit - II: Basic Geodesy, Scale – Concept and application

- (a) Spherical Earth, Ellipsoidal Earth. Geoid Earth
- (b) Geographical Coordinates (Latitude and Longitude), Graticules
- (c) Scale, Construction of types of Scales (Plain, Comparative and Diagonal Scale)

Unit - III: Map Projections

- (a) Meaning and Use, Brief Historical aspect.
- (b) Transformation of area, Distance and Direction
- (c) Simple Cylindrical Projection, Conical Projection with one standard projection

Unit - IV: Slope Analysis and Geological Map Gradient and slope

- (a) Interpretation of Bedding plane, Strike, Dip, structure & stratigraphy of Geological map.
- (b) Slope defined and methods of determination of slope (Wentworth's method and Smith)

Practical

1. Construction and use of Graphical, RF & Statement Scale, Diagonal Scale
2. Grid Reference System, Latitude, Longitude, International Date Line, Date and Time based on GMT & IST)

3. Construction of Map Projections: Simple Cylindrical, Simple conical Projection with one and two standard parallels, Polyconic , Gnomonic and Mercator's
4. Cartograms of one, two and three dimensions—Simple and Complex bars, circle and sphere diagram, block diagrams.
5. Drawing of Choropleth and isopleths maps, relief and slope maps
6. Practical record and viva-voce

Reading Materials

Text Book

1. Singh R. L. and Singh R. P. B., 1999: Elements of Practical Geography, Kalyani Publishers.
2. Mishra R.P. and Ramesh, A., 1989: Fundamentals of Cartography, Concept, New Delhi.

Reference Books

- Anson R. and Ormelling F. J., 1994: International Cartographic Association: Basic Cartographic Vol. Pregmen Press.
- Monkhouse F. J. and Wilkinson H. R., 1973: Maps and Diagrams, Methuen, London.
- Robinson A. H., 2009: Elements of Cartography, John Wiley and Sons, New York.
- Sarkar, A. (2015) Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi.

CC - III: Human Geography

Course Objectives:

This course is designed to enable students to conduct basic analysis of how economic, political, and cultural processes are shaping human experiences at different geographic scales. The course assists students to interpret how humans are interacting with Earth surface.

Course Outcomes (COs)

The students will be able to:

- CO-01: Describe what human geography is by understand the population dynamics (OBE Level: Apply)
- CO-02: Explore the trend patterns of population characteristics across the globe (OBE Level: Analyze)
- CO-03: Examine demographic characteristics of population (OBE Level: Evaluate)
- CO-04: Evaluate the impact of humans on Earth through Urbanization (OBE Level: Evaluate)

Course Work

Unit - I: Introduction: Defining Human Geography: Nature, scope and Contemporary Relevance, Man-nature Relationship: Major racial groups and their characteristics

Unit - II: World distribution of major racial groups, language and religion, Cultural realms of the world

Unit - III: Demographic Characteristics of population: Population Composition (Male & Female, Sex Ratio, Age and Sex, Occupational Structure, Population Density), Factor affecting population distribution, Trend of World Population Growth, Demographic Transition Theory, Population Problems in developed and under developed world.

Unit IV: Settlements: Types and pattern of Rural and urban Settlements; concept of urban area, towns and cities, Size Class and Functional Classification of towns and Trend of Urbanization of the world

Practical

1. Drawing of age sex pyramid of developed, developing and under developed countries
2. Drawing of population distribution maps using symbols–Simple and multiple dots, circles and spheres, choropleth maps of population density distribution
3. Drawing of Pie Diagram (Using population data of occupational structure, population composition)

4. Trend of population growth, growth of urban population and settlements
5. Practical records and viva -voce

Reading Materials

Text Book

1. Hussain, Majid (2012) Human Geography. Rawat Publications, Jaipur

Reference Books

- Human & Economic Geography- Go Cheng Leong
- Johnston R; Gregory D, Pratt G. et al. (2008) The Dictionary of Human Geography, Blackwell Publication.
- Daniel, P.A. and Hopkinson, M.F. (1989). The Geography of Settlement, Oliver & Boyd, London. Human Geography, Rupa Publication
- Human Geography, B.S. Negi
- Chandna, R.C. (2010) Population Geography, Kalyani Publisher.
- Hassan, M.I. (2005) Population Geography, Rawat Publications, Jaipur
- Jordan-Bychkov et al. (2006) The Human Mosaic: A Thematic Introduction to Cultural Geography. W. H. Freeman and Company, New York.

CC - IV: Climatology

Course Objectives:

The course aims to study the nature of climate, the causes and interpretations of its spatial variation and its association with the Earth.

Course Outcomes (COs)

The students will be able to:

- CO-01: Gain knowledge of atmospheric composition, weather and climate dynamics, energy balance processes, global temperature patterns, and temperature inversion phenomena, facilitating comprehension of meteorological principles and their environmental implications. (Knowledge)
- CO-02: Gain understanding of global atmospheric circulation patterns, including pressure systems and wind movements, and their impact on weather phenomena, climate variability, and air transport. (Understanding)
- CO-03: Develop knowledge of atmospheric moisture, condensation processes, cloud and precipitation types, and climate classification methods, enabling interpretation of weather patterns and climatic characteristics for various geographical regions. (Application)
- CO-04: Gain understanding of air mass dynamics, severe weather phenomena, including thunderstorms, tornadoes, and cyclones, and methods of weather forecasting, facilitating analysis of weather patterns and prediction of atmospheric conditions. (Synthesis)

Course Work

Unit - I: Composition and Structure of the atmosphere, Weather and Climate : Elements and Factors, Insolation and Heat Budget of the Earth, World distribution of Temperature – Factors of Distribution, Temperature Inversion.

Unit - II: Atmospheric Pressure and Winds – Pressure Belts and Planetary Winds, Periodic and local winds, Factors affecting general circulation of wind, coriolis effect, Jet Stream.

Unit - III: Humidity: relative and absolute, Forms of Condensation, types of clouds, types of precipitation, classification of climate of Koppen and Thonrthwait.

Unit - IV: Concept of air mass, classification, characteristics, distribution and modification, thunderstorms and tornado, Tropical Cyclones, Temperate Cyclones, weather forecasting.

Practical

1. Introduction to use of simple weather observation instruments: Thermometer, Barometer, hygrometer, anemometer, wind vane, Rain Gauge, Stevenson Screen, Interpretation of

- weather maps
2. Drawing of Climograph and Hythergraph, Wind rose diagram.
 3. Drawing of isopleth maps : isotherms, isobars and isohyets
 4. Spatial and temporal distribution of rainfall using choropleth techniques and trend graphs
 5. Record & Viva-Voce carries 10 marks

Reading Materials

Text Book

1. Lal, D S (2006): Climatology, Prayagn Pustak Bhavan, Allahabad

Reading List

- Barry R. G. and Carleton A. M., 2001: *Synoptic and Dynamic Climatology*, Routledge, UK.
- Barry R. G. and Corley R. J., 1998: *Atmosphere, Weather and Climate*, Routledge, New York.
- Critchfield H. J., 1987: *General Climatology*, Prentice-Hall of India, New Delhi
- Lutgens F. K., Tarbuck E. J. and Tasa D., 2009: *The Atmosphere: An Introduction to Meteorology*, Prentice-Hall, Englewood Cliffs, New Jersey.
- Oliver J. E. and Hidore J. J., 2002: *Climatology: An Atmospheric Science*, Pearson Education, New Delhi.
- Trewartha G. T. and Horne L. H., 1980: *An Introduction to Climate*, McGraw-Hill.
- Gupta L S(2000): *Jalvayu Vigyan*, Hindi Madhyam Karyanvay Nidishalya, Delhi Vishwa Vidhyalaya, Delhi
- Vatal, M (1986): *Bhautik Bhugol*, Central Book Depot, Allahabad
- Singh, S (2009): *Jalvayu Vigyan*, Prayag Pustak Bhawan, Allahabad

CC - V: Oceanography

Course Objectives:

- To study the physical, chemical, biological, and geological aspects of the ocean, including its currents, tides, waves, chemistry, ecosystems, and seabed topography
- Students aim to investigate marine biodiversity, including the distribution, abundance, behaviour, and ecological roles of marine organisms, from microscopic plankton to large marine mammals.
- Students learn to monitor and understand the impact of human activities, climate change, and natural phenomena on the ocean, including ocean acidification, sea level rise, pollution, and habitat destruction.
- To provide scientific knowledge and data to support evidence-based decision-making and policy development related to marine conservation, sustainable development, maritime transportation, and coastal zone management.

Course Outcome (Cos)

CO-01: The outcomes of oceanography studies are multifaceted and encompass various aspects of scientific understanding, technological innovation, environmental stewardship, and societal impact. Here are some key outcomes:

CO-02: Oceanography studies generate a wealth of scientific knowledge about the physical, chemical, biological, and geological processes of the oceans. This knowledge contributes to our understanding of Earth's systems, climate dynamics, marine ecosystems, and biodiversity (Remember).

CO-03: Oceanography drives technological innovations in ocean exploration, observation, and data collection. Advanced instruments, platforms, and sensors developed for oceanographic research have broader applications in fields such as marine engineering, remote sensing, and environmental monitoring (Describe).

CO-04: Oceanography studies contribute to the prediction and mitigation of natural hazards such as hurricanes, tsunamis, and coastal erosion (Analyse).

Course Work

Unit - I: Bottom Relief of the Oceans: Continental shelf, slope, deep sea plain, ocean deeps, mid oceanic ridges, relief features of the Atlantic, Indian and Pacific Ocean.

Unit - II: Origin of ocean water, Temperature and salinity of ocean -distribution and determinants, T-S Diagram Ocean Deposits: classification and Distribution.

Unit - III: Movement of Ocean water- Waves, Currents and Tides: Types and characteristics, factors associated with the origin of ocean currents and their impacts, Ocean currents of the Atlantic, Indian and Pacific ocean

Unit -IV: Coral Reefs and atoll: Types, Theories of Origin (Subsidence theory of Darwin and Dana, Glacial Control theory of Louis Agassiz), Marine resources

Practical

1. Interpretation of Topographical Maps.
2. Demarcation of catchment basins and drainage networks, stream ordering and identification and interpretation of drainage patterns.
3. Enlargement and reduction of maps: Graphical and instrumental, use of pantographs
4. Practical records and viva -voce

Reading Materials

Text Book

1. Sharma R. C. and M. Vital: Oceanography
2. Lal, D. S. – Oceanography.

Reference Book:

- King, L. C. : Oceanography
- Singh, S. – Physical Geography

CC - VI: Statistical Methods in Geography

Course Objectives:

- To familiarize students with the use of data in geography, including spatial and attribute data, the geographical data matrix, types and sources of data (discrete and grouped, primary and secondary), and scales of measurement of data (nominal, ordinal, interval, ratio).
- To introduce students to descriptive statistics, including frequency distribution for both grouped and ungrouped data, measures of central tendency (mean, median, and mode), and types of sampling methods (random, stratified, systematic, and purposive).
- To teach students about measures of dispersion including variance, mean deviation, standard deviation, coefficient of variation, and the Chi-square test.
- To instruct students on measures of association, including product moment correlation, rank correlation, significance testing, coefficient of determination, and linear regression.

Course Outcomes (COs)

The students will be able to:

CO-01: CO1: Students should be able to identify and differentiate between spatial and attribute data, understand the geographical data matrix, distinguish between types and sources of data, and recognize different scales of measurement (nominal, ordinal, interval, ratio). They should also be able to analyze data distribution, including normal and binomial distributions. (Knowledge)

CO-02: CO2: Students should be able to construct frequency distributions for data sets, calculate measures of central tendency, and understand the principles and applications of various sampling techniques. (Understanding)

CO-03: CO3: Students should be able to calculate and interpret measures of dispersion, understand their significance in analyzing data variability, and apply the Chi-square test for assessing the association between categorical variables. (Application)

CO-04: CO4: Students should be proficient in calculating and interpreting various measures of association, determining the strength and direction of relationships between variables, conducting significance tests, and performing linear regression analysis for predictive modeling. (Synthesis)

Course Work

Unit - I: Use of Data in Geography: Spatial and attribute data, Geographical Data Matrix, Types and Sources of Data (Discrete and grouped, primary and secondary), Scales of Measurement of data (Nominal, Ordinal, Interval, Ratio). Distribution of Data: Normal and Bi-nomial

Unit - II: Descriptive Statistics: Frequency distribution (grouped and ungrouped data), measures of Central Tendency (Mean, Median and Mode), Types of Sampling-Random, stratified, systematic

and purposive

Unit - III: Measures of Dispersion (Variance, Mean Deviation, Standard Deviation and Coefficient of Variation. Chi-square test

Unit - IV: Measures of Association:, Product moment correlation, Rank correlation , test of significance, coefficient of determination and linear regression.,

Practical

1. Drawing of histogram, frequency curve and ogive in grouped and discrete data
2. Calculation & Drawing of graphs showing mean, median, mode in grouped & discrete data
3. Calculation of mean deviation, standard deviation, coefficient of variation,
4. Practical records and viva -voce

Reading Materials

Text Book:

1. Mahmood A., 1977: *Statistical Methods in Geographical Studies*, Concept.
2. Sarkar, A. (2013) *Quantitative geography: techniques and presentations*. Orient Black Swan Private Ltd., New Delhi

Reference Book:

- Hammond P. and McCullagh P. S., 1978: *Quantitative Techniques in Geography: An Introduction*, Oxford University Press.
- Yeates M., 1974: *An Introduction to Quantitative Analysis in Human Geography*, McGraw Hill, NY
- Silk J., 1979: *Statistical Concepts in Geography*, Allen and Unwin, London
- King L. S., 1969: *Statistical Analysis in Geography*, Prentice-Hall
- Pal S. K., 1998: *Statistics for Geoscientists*, Tata McGraw Hill, New Delhi
- Ebdon D., 1977: *Statistics in Geography: A Practical Approach*.

CC - VII: Geography of Odisha

Course Objectives:

To provide a broad understanding Odisha covering its geographical aspects and influences

Course Outcomes (COs)

The students will be able to:

- CO-01: Understand the basics of geographies of Odisha (OBE Level: Understand)
- CO-02: Understand the spatial distribution and problems and prospects of agricultural products and minerals in Odisha (OBE Level: Apply)
- CO-03: Assess the resources of Odisha (OBE Level: Analyze)
- CO-04: Evaluate the problems and management of Odisha's (OBE Level: Evaluate)

Course Work

Unit - I: Physiography of Odisha, River System, Climate, Soil, Natural Vegetation

Unit - II: Agriculture:

- (a) Production and Distribution of Rice, Pulses, Oil seeds;
- (b) Agricultural Problems and Prospects

Unit - III: Minerals and power recourses:

- (a) Distribution and production of Iron Ore, Bauxite, Chromite, Coal
- (b) Industrialization in Odisha – Problems and prospects, Iron and steel industry, Aluminum Industry, Textile, thermal power plants

Unit - IV:

- (a) Population: Distribution and Growth, distribution of tribes and tribal population
- (b) Urbanization-Growth of urban population and urban centers
- (c) Transport : Roadways & Railways

Practical

1. Rainfall distribution of Odisha using choropleth techniques (State & District/ District & block)
2. Temperature / rainfall distribution using isopleth techniques giving point level data of important observation centers
3. Drawing of time series graphs to depict decadal growth of population/ urban population
4. Cartographic representation of socio-economic data (One, two three dimensional)
5. Practical records and viva -voce

Reading Materials

Text Book:

1. Sinha, B. N. - Geography of Odisha

Reading List:

1. Roy, G. C.- Geography of Odisha

CC - VIII: Evolution of Geographical Thought

Course Objectives:

The main objective of this course is to understand the progress of sciences, especially geography, during the ancient classical period. It maps different historical and contemporary geographical contributions, and investigates them in greater depth selected overarching geographical concepts, debates and issues.

Course Outcomes (COs)

The students will be able to:

CO-01: Provide the basic conceptual understanding of temporal succession of geographical views from ancient times to the present time (OBE Level: Understand);

CO-02: Understand and interpret the evolution of the philosophy, methods and approaches of Geography in the present context (OBE Level: Apply);

CO-03: Compare different approaches and methods to study geographical phenomena (OBE Level: Analyze);

CO-04: Analyze the paradigm shift in Geographical philosophy, methods and approaches (OBE Level: Evaluate);

Course Work

Unit - I: Geographical concepts of ancient and mediaval period: Contributions of Greek, Roman & Indian and Arab scholars.

Unit-II: Modern geographical thought: Contributions of Alexander Von Humboldt, Carl Ritter, Ratzel, Vidal De La Blache and Mackinder.

Unit III: Dichotomy in Geography– Environmental Determinism and Possibilism, Systematic and Regional Geography, Ideographic and Nomeothetic, Physical and Human Geography.

Unit-IV: Recent Trends in development of geography– Quantitative Revolution in Geography, Behavioural approach in Geography, radicalism in Geography, Recent changes in methods and approaches to geography.

Practical

1. Introduction to and use of survey Instruments: Prismatic Compass, Leveling, Theodolite / Total Station,
2. Methods of Surveying: Radiation, Intersection, Resection Traversing (Close and Open)
3. Use of GPS / DGPS in observation of coordinate values of a number of points and preparing an outline map of an area by interpolation
4. Preparation and uses of questionnaire and schedule in a socio economic survey

5. Practical records and viva -voce

Reading Material

Text Book:

1. Evolution of Geographical Thought- Majid Hussain

Reference Books:

1. Dikshit R. D., 1997: *Geographical Thought: A Contextual History of Ideas*, Prentice– Hall India.
2. Hartshone R., 1959: *Perspectives of Nature of Geography*, Rand MacNally and Co.
3. Martin Geoffrey J., 2005: *All Possible Worlds: A History of Geographical Ideas*, Oxford.
4. Holt-Jensen A., 2011: *Geography: History and Its Concepts: A Students Guide*, SAGE.
5. Kapur A., 2001: *Indian Geography Voice of Concern*, Concept Publications.

CC - IX: Economic Geography

Course Objectives:

The course is designed to the study of the relationship between geography and economy. It explores the spatial dimensions of income by people and organizations and how the economy interacts with the physical environment along with the problems management of different economic activities.

Course Outcomes (COs)

The students will be able to:

- CO-01: Provide the basic conceptual understanding of economic activities and its association with geography (OBE Level: Understand);
- CO-02: Examine different economic theories (OBE Level: Apply);
- CO-03: Explore different economic activities (OBE Level: Analyze);
- CO-04: Evaluate the problems and management associated with different activities (OBE Level: Evaluate);

Course Work

Unit - I: Meaning and scope of economic geography, classification of economic activities, Factors affecting location of economic activity with special reference to agriculture and industry, Von Thunen Theory of location of agricultural activity and Weber's theory of Industrial Location.

Unit - II: Primary economic activities: Types and problems, (Subsistence farming, shifting cultivation, forestry and fishing, mining and quarrying), agricultural regions of the world.

Unit - III: Secondary economic activities: Manufacturing (Cotton Textile, Iron and Steel), Industrial Regions of the world: Special Economic Zones and its significance.

Unit - IV: Tertiary economic activities: Transport- Roads and Railways, Air and Water ways, Trade and commerce

Practical

1. Determination of agricultural efficiency (Kendal and Bhatia method) and to show on maps
2. Drawing of Isotims, Isodapanes and industrial location based on Weber's theory,.
3. Traffic flow diagram and travel time maps (Isochrones).
4. Practical records and viva -voce

Reading Materials

Text Book

1. Roy, Pritish: *Economic Geography*

2. Gautam, Alaka: *Economic Geography*,

Reference Book

1. Alexander J. W., 1963: *Economic Geography*, Prentice-Hall Inc., Englewood Cliffs, New Jersey.
2. Wheeler J. O., 1998: *Economic Geography*, Wiley.
3. Durand L., 1961: *Economic Geography*, Crowell.
4. Willington D. E., 2008: *Economic Geography*, Husband Press.
5. Clark, Gordon L.; Feldman, M.P. and Gertler, M.S., eds. 2000: *The Oxford*

CC - X: Environmental Geography

Course Objectives:

The aim of this course is to provide students with a comprehensive understanding of environmental geography, encompassing concepts such as the scope of the environment, characteristics of biotic, abiotic, and cultural elements, global and local environmental contrasts, ecosystem structure and functions, biomes, and the impact of pollution. The course aims to equip students with knowledge on environmental degradation, conservation methods, and sustainable development strategies, along with an awareness of international agencies' roles in environmental management.

Course Outcomes (COs)

CO-01: Understand the concepts and scope of Environmental Geography, distinguish between biotic, abiotic, and cultural environmental components, and analyse environmental contrasts on global, continental, and local scales.

CO-02: Comprehend the structure and functions of ecosystems, explore trophic levels, food chains, and food webs, and explain the bio-geochemical cycles of nitrogen and carbon. Gain insights into energy flow within ecosystems.

CO-03: Define the concept of Biome, identify major world biomes (Equatorial, Subtropical, Temperate, Polar), and analyse the nature and characteristics of environmental pollution in water and air.

CO-04: Recognize environmental degradation causes and consequences, assess methods for environmental conservation, and evaluate India's environmental conservation programs and policies. Understand the role of international agencies (UNO, UNEP, UNDP, IUCN) in environmental management. Explore sustainable development concepts and strategies, and comprehend the functions of the Green Tribunal in India.

Course-work

Unit - I: Environmental Geography – Concept and Scope, Types and Characteristics of environment: Biotic, abiotic and cultural, Environmental contrast (Global, Continental, Local) Environmental control and concept of tolerance (Light, Temperature, Water, Topography and Edaphic factors)

Unit - II: Ecosystem – Concept, Structure and Functions, Trophic level, food Chain and food web, Bio- geo-chemical Cycle (Nitrogen and Carbon), Energy flow in Ecosystem.

Unit -III: Concept of Biome, Major biomes of the world and their characteristics: Equatorial, Sub-tropical, Temperate and Polar, Nature and characteristics of environmental pollution of water and air

Unit -IV: Environmental degradation; causes and consequences, Environmental conservation methods, programmes and policies in India, Role of International agencies (UNO,UNEP,UNDP, IUCN

in environmental management, concept and strategies of sustainable development, Green Tribunal and its functions in India.

Practical (Project Work)

1. Submission of a Project Report on any environmental problem of global/national/local significance

Reading Materials

Text Book:

1. Santra, S.C *Environmental Science*
2. Singh S., 1997: *Environmental Geography*, Prayag Pustak Bhawan. Allahabad.

Reference Book:

- Chandna R. C., 2002: *Environmental Geography*, Kalyani, Ludhiana.
- Cunningham W. P. and Cunningham M. A., 2004: *Principals of Environmental Science: Inquiry and Applications*, Tata Macgraw Hill, New Delhi.
- Goudie A., 2001: *The Nature of the Environment*, Blackwell, Oxford.
- Miller G. T., 2004: *Environmental Science: Working with the Earth*, Thomson BrooksCole, Singapore.
- Odum, E. P. et al, 2005: *Fundamentals of Ecology*, Ceneage Learning India.

CC - XI: Regional Planning and Development

Course Objectives:

The main objective of this course is to enable the students to handle issues of land use, understand the different kinds of planning processes by providing complete understanding of process of regional planning and development.

Course Outcomes (COs)

The students will be able to:

- CO-01: Provide the conceptual understanding of regional study in Geography (OBE Level: Understand)
- CO-02: Interpret different approaches and methods of delineating regions to study Geographical phenomena (OBE Level: Apply)
- CO-03: Analyze the different policies and programs of India to reduce regional imbalances in the present context (OBE Level: Analyze)
- CO-04: Compare the different theories and models of regional planning in the context of India as well as the world (OBE Level: Evaluate)

Course-work

Unit - I: Concept of a Region, Types of region: Formal, Functional and Planning Region, Need for Regional Planning, Evolution of Regional planning in India during five year plans, Characteristics of an Ideal Planning Region

Unit - II: Delineation of Planning Regions; Approaches and Methods, Regional disparity and imbalances in India, Planning Regions of India

Unit - III: Theories and Models for Regional Planning: Growth Pole Model of Perroux; Myrdal, Hirschman, Rostow.

Unit - IV: Policies and Programs for Rural and Regional Development Planning in India, Welfare Programs: IRDP, DPAP, Planning for backward regions, TDA and ITDP, planning for National Capital Region, Urban Area Programs, Concept and application of Human development Index in planning and development

Practical

1. Transport network analysis –Alfa, Beta, Gama indices
2. Nearest neighbor analysis
3. Mapping regional Disparity based on socio-economic data
4. Mapping levels of development based on socio-economic data
5. Practical record and viva-voce

Reading materials

Text Book

1. Chand, Mahesh and V. K. Puri: Regional Planning
2. Mishra R. P : Regional Planning, Concept Publishers, New Delhi

Reference Book:

1. Friedmann J. and Alonso W. (1975): *Regional Policy - Readings in Theory and Applications*, MIT Press, Massachusetts.
2. Haynes J., 2008: *Development Studies*, Polity Short Introduction Series.
3. Peet R., 1999: *Theories of Development*, The Guilford Press, New York.
4. UNDP 2001-04: *Human Development Report*, Oxford University Press.
5. World Bank 2001-05: *World Development Report*, Oxford University Press, New

CC - XII: Remote Sensing and GIS

Course Objectives:

Remote Sensing (RS) and GIS (Geographic Information Systems) are vast and multifaceted, impacting various fields including environmental science, urban planning, agriculture, disaster management, and more. They facilitate the monitoring and management of natural resources such as forests, water bodies, and agricultural land.

Course Outcomes (COs)

The students will be able to:

- CO-01: Gain a thorough understanding of remote sensing technologies, such as satellite sensors, aerial photography, LiDAR, and drone imagery.
- CO-02: Develop skills in image processing, data manipulation, and spatial analysis techniques. They learn how to extract meaningful information from remote sensing imagery and combine it with other spatial datasets for in-depth analysis.
- CO-03: Use GIS software to display and communicate spatial data effectively. They gain knowledge of cartographic principles, symbolization, and map design to produce clear and informative maps.
- CO-04: Drawn to remote sensing and GIS because of their applications in environmental and natural resource management.

Course-work

Unit - I: Remote Sensing: Definition and Components, EMS and EMR, Wave and Particle theory of EMR, Types of platforms and sensors, Advantages and limitation of Remote Sensing, Energy interaction with Atmosphere and Earth Surface features (Water, soil and vegetation)

Unit - II: Aerial Photography, Principles of stereo vision, Geometry of Aerial Photographs, Image elements and visual interpretation of satellite images.

Unit - III: GIS: definition and components, Types of GIS Data (Spatial and attribute), Raster and Vector Data models, Special functions of GIS, GPS elements and its uses..

Unit - IV: Application of RS & GIS in land use and land cover mapping, Application in cartography and map making, Mapping of water resources and Natural Vegetation

Practical

1. Stereoscopic vision using stereo cards and identification of objects from cards
2. Feature identification from aerial photographs using Pocket stereoscope/Mirror stereoscope
3. Feature identification from satellite imageries using visual interpretation
4. Identification and mapping of water bodies from satellite imageries
5. Digitization of Odisha state/block /district map and drawing of few point, line and polygon

features

Reading Materials

Text Book

1. Lillesand T. M., Kiefer R. W. and Chipman J. W., 2004: *Remote Sensing and Image Interpretation*, Wiley. (Wiley Student Edition).

Reference Book:

1. Bhatta, B. (2008) *Remote Sensing and GIS*, Oxford University Press, New Delhi.
2. Campbell J. B., 2007: *Introduction to Remote Sensing*, Guildford Press
2. Chauniyal, D. (2010) *Sudur Samvedana Avam Bhaugolik Suchna Pranali*, Sharda Pustak Bhawan, Allahabad.
3. Jensen, J. R. (2005) *Introductory Digital Image Processing: A Remote Sensing Perspective*, Pearson Prentice-Hall.
4. Joseph, G. 2005: *Fundamentals of Remote Sensing* United Press India.

CC - XIII: Geography of India

Course Objectives:

This course aims to provide students an overall understanding of India covering its all kind of geographies and resources along with the problems critical to India.

Course Outcomes (COs)

The students will be able to:

CO-01: Review physiographic and climatic characteristics of India (OBE Level: Understand)

CO-02: Assess demographic characteristics of India (OBE Level: Apply)

CO-03: Examine natural resources of India (OBE Level: Analyze)

CO-04: Examine agricultural resources of India (OBE Level: Analyze)

Course-work

Unit - I: Triple tectonic divisions, Physiography of the Himalayas, Indo-Gangetic Plains, Peninsular India, Climate of India : Weather characteristics of SW and NE Monsoon, soil and natural vegetation

Unit -II:Population Distribution, Demographic structure, trend of population growth and urbanization, Distribution of major tribal groups of India, India's population problems and prospects

Unit-III: Distribution and utilisation of iron ore, nuclear minerals, coal, petroleum, natural gas, Factors of location and development of automobile, IT, Iron & Steel and Cotton Textile industries, Industrial regions of India

Unit - IV: Types of Irrigation in India, characteristics of Indian Agriculture, cropping pattern, production and distribution of rice and wheat, Tea and Coffee, problems of Indian Agriculture

Practical

1. Population density map of India by Choropleth
2. Graphical & cartographic presentation of socio-economic data
3. Pie chart showing occupational structure of India
4. Population pyramid for India
5. Practical record and viva-voce (10 marks)

Reading Materials

Text Book

1. Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur
2. Khullar, D. R. India: A Comprehensive Geography

Reference Book:

1. Deshpande C. D., 1992: India: A Regional Interpretation, ICSSR, New Delhi.
2. Mandal R. B. (ed.), 1990: Patterns of Regional Geography – An International Perspective. Vol. 3 – Indian Perspective.
3. Sharma, T. C. 2003: India - Economic and Commercial Geography. Vikas Publ., New Delhi.
4. Singh R. L., 1971: India: A Regional Geography, National Geographical Society of India.
5. Singh, Jagdish 2003: India - A Comprehensive & Systematic Geography, Gyanodaya Prakashan, Gorakhpur.
6. Spate O. H. K. and Learmonth A. T. A., 1967: India and Pakistan: A General and Regional Geography, Methuen.

CC - XIV: Disaster Management

Course Objectives:

Disaster management studies aim to understand and effectively respond to emergencies, disasters, and crises. It involves the study and analysis of various aspects of disasters, including their causes, impacts, and mitigation strategies.

Course Outcomes (COs)

The outcomes of disaster management studies encompass a wide range of benefits and achievements. Here are some notable outcomes

- CO-01: Disaster management studies contribute to identifying and addressing vulnerabilities within communities and infrastructure. Through risk assessments and analysis, appropriate measures can be implemented to reduce vulnerability to hazards (Remember)
- CO-02: Studies help in analysing and improving emergency response mechanisms. By studying past disasters and evaluating response strategies, more efficient and coordinated response systems can be developed (Describe).
- CO-03: Disaster management studies contribute to enhancing resilience at the individual, community, and institutional levels (Analyse).
- CO-04: Disaster management studies generate new knowledge, insights, and best practices through research, case studies, and analysis. This knowledge helps inform policies, guidelines, and decision-making processes related to disaster management (Evaluate).

Course-work

Unit-I: Concept of Hazards and Disasters, Natural and manmade hazards, Types of hazards, Concept of Vulnerability and risk, prevention, mitigation and management.

Unit-II: Disaster management cycle, Pre disaster planning, During disaster management, Post Disaster planning and development, community based disaster preparedness, Role of various stake holders (NGO, GO, NDMA, NIDM, NDRF, ODRAF and OSDMA) in disaster management.

Unit-III: Detail study of nature, characteristics and management of natural hazards: Flood, Cyclone, Drought, Earthquake, Tsunami and Land Slide

Unit-IV: Man made hazards and disasters, causes and impacts; Fire hazards, industrial hazards and nuclear hazards, Salient features of India's disaster management policy.

Practical

1. **Project work** – Preparation of a case study report on a specific hazard / disaster based on

literature review and or field work

Reading Materials

Text books

1. Singh, Savindar (2009): Disaster Management

Reference books:

1. Mishra B.J : Natural hazards and disaster management
2. Sundar I & Sezuiyan T : Disaster management
3. Verma : Encyclopedia of Disaster management
4. Eye Publication : Vulnerable India
5. Sinha. A. – Disaster management, United Press
6. Singh R.B – Risk Assessment and Vulnerability analysis.

Discipline Specific Elective

DSE I : Population Geography

Course Objectives:

This course assists students to understand the various aspects of human population across the Earth with reference to the physical, cultural and socio-economic environment and to measure the current and future needs.

Course Outcomes (COs)

The students will be able to:

- CO-01: Gain a comprehensive understanding of the field of population geography and interpret its role (OBE Level: Apply)
- CO-02: Analyze the factors and determinants influencing population (OBE Level: Analyze)
- CO-03: Examine the determinants of Population Growth (OBE Level: Analyze)
- CO-04: Assess composition and characteristics of population (OBE Level: Evaluate)

Course-work

Unit- I: Defining the Field, Nature and Scope of population geography; Sources of population data with special reference to India (Census, Vital Statistics and NSS), Population problems and issues.

Unit- II: Population Size, Distribution and Growth – Factors and Determinants, Theories of Growth – Malthusian Theory and Demographic Transition Theory.

Unit-III: Determinants of Population Growth: Fertility, Mortality and Migration-Measures, determinants and implications of fertility, mortality and migration.

Unit-IV: Population Composition and Characteristics – Age-Sex, Rural-Urban, Literacy, Occupational structure, Contemporary population issues—Ageing of Population; Declining Sex Ratio; HIV/AIDS, Trend of urbanization and related Problems.

Practical

1. Population projection: AP, GP and R.G India method, calculation and graphical display
2. Drawing of triangular diagram and Lorenz curve
3. Construction of compound and superimposed pyramids
4. Calculation and presentation of population growth Rate, infant and neonatal mortality rate, maternal mortality ratio based on supplied data
5. Practical record and Viva-Voce

Reading Materials

Text book

1.Chandna R. C. and Sidhu M. S., 1980: *An Introduction to Population Geography*, Kalyani Publishers.

Reading List:

- Barrett H. R., 1995: *Population Geography*, Oliver and Boyd.
- Bhende A. and Kanitkar T., 2000: *Principles of Population Studies*, Himalaya Publishing House.
- Clarke J. I., 1965: *Population Geography*, Pergamon Press, Oxford.
- Jones, H. R., 2000: *Population Geography*, 3rd ed. Paul Chapman, London.
- Lutz W., Warren C. S. and Scherbov S., 2004: *The End of the World Population Growth in the 21st Century*, Earthscan.
- Newbold K. B., 2009: *Population Geography: Tools and Issues*, Rowman and Littlefield Publishers.
- Pacione M., 1986: *Population Geography: Progress and Prospect*, Taylor and Francis.
- Wilson M. G. A., 1968: *Population Geography*, Nelson.
- Panda B P (1988): *Janasankya Bhugol*, M P Hindi Granth Academy, Bhopal
- Maurya S D (2009) *Jansankya Bhugol*, Sharda Putak Bhawan, Allahabad
- Chandna, R C (2006), *Jansankhya Bhugol*, Kalyani Publishers, Delhi

DSE - II: Resource Geography

Course Objectives:

This course is designed to study of the distribution and characteristics of natural resources, spanning from one region from another. It focuses on utilization, evaluation, conservation and management of resources in relation to environment.

Course Outcomes (COs)

The students will be able to:

- CO-01: Gain a comprehensive understanding of the Resource Geography covering its types and functions (OBE Level: Apply)
- CO-02: Analyze spatial distribution and characteristics of various natural resources at national and international scale (OBE Level: Analyze)
- CO-03: Examine problems associated with various natural resource (OBE Level: Analyze)
- CO-04: Evaluate different theory and approach associated with resources (OBE Level: Evaluate)

Course work

Unit - I: Natural Resources: Concept, Types, Classification, and Functional Theory of Resources

Unit II: Distribution and Utilization of Land Resources, Water Resources, Forest resources and Energy Resources and mineral resources.

Unit-III: Problems in exploitation, depletion and degradation of resources, Methods of conservation and management of Land, Water, Forest, mineral & Energy Resources

Unit IV: Resource scarcity hypothesis , Concept and approach towards sustainable development of resources,

Practical

1. Simple Correlation and interpretation of correlation coefficient
2. Test of significance of correlation coefficient
3. Rank Correlation
4. Simple Linear Regression, Drawing of scattergram and regression line
5. Practical record and viva-voce

Reading Materials

Text book

1. Singh, R.L. 1988 (Reprint) — India: A Regional Geography

Reading List:

- Gadgil M. and Guha R., 2005: *The Use and Abuse of Nature: Incorporating This Fissured Land: An Ecological History of India and Ecology and Equity*, Oxford University Press. USA.
- Jones G. & Hollier G., 1997: *Resources, Society and Environmental Management*, Paul Chapman, London.
- Klee G., 1991: *Conservation of Natural Resources*, Prentice Hall, Englewood.
- Mather A. S. and Chapman K., 1995: *Environmental Resources*, John Wiley and Sons, New York.
- Mitchell B., 1997: *Resource and Environmental Management*, Longman Harlow, England.
- Owen S. and Owen P. L., 1991: *Environment, Resources and Conservation*, Cambridge Univ. Press, NY
- Rees J., 1990: *Natural Resources: Allocation, Economics and Policy*, Routledge. London.

DSE – III: Urban Geography

Course Objectives:

This course is designed to explain students how cities are formed; how do they function; how and why they change and what the major patterns of historical, economic area, and social connectivity of cities within themselves as well as with their surrounding areas.

Course Outcomes (COs)

The students will be able to:

CO-01: Gain a comprehensive understanding of the Urban Geography with its history, trend and patterns (OBE Level: Apply)

CO-02: Analyze the components, shapes and types of cities (OBE Level: Analyze)

CO-03: Examine the theories and problems associated urban areas (OBE Level: Evaluate)

CO-04: Evaluate different cities based on the understanding developed through previous objectives (OBE Level: Create)

Course Work

Unit - I: Urban geography: Introduction, nature and scope; history of urbanization, Trends and Patterns of Urbanization in developed, developing countries, world and India.

Unit -II: Functional classification of cities: Quantitative and Qualitative Methods, Christaller Theory, Morphology of Urban Settlements & Urban Sphere of Influence and umland, concept of CBD, rural-urban fringe.

Unit-III: Theories of urban growth, Urban Issues: problems of housing, slums, civic amenities (water and transport), Air Pollution and Noise Pollution,

Unit -IV: Case studies of Delhi, Mumbai, Kolkata, Bhubaneswar and Chandigarh with reference to city planning and Urban Issues.

Practical

1. Functional classification of towns
2. Projection of urban population
3. Delimitation of C.B.D and umland
4. Gravity and population potential model.
5. Practical Record and Viva-Voce (10 marks)

Reading Materials

Text books

1. Ramachandran R (1989): Urbanisation and Urban Systems of India, Oxford University Press, New Delhi

Reading List:

- Fyfe N. R. and Kenny J. T., 2005: *The Urban Geography Reader*, Routledge.
- Graham S. and Marvin S., 2001: *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition*, Routledge.
- Hall T., 2006: *Urban Geography*, Taylor and Francis.
- Kaplan D. H., Wheeler J. O. and Holloway S. R., 2008: *Urban Geography*, John Wiley.
- Knox P. L. & McCarthy L., 2005: *Urbanization: An Introduction to Urban Geography*, Prentice Hall NY.
- Sassen S., 2001: *The Global City: New York, London and Tokyo*, Princeton University Press.
- Ramachandran R (1989): *Urbanisation and Urban Systems of India*, Oxford University Press, New Delhi
- Ramachandran, R., 1992: *The Study of Urbanisation*, Oxford University Press, Delhi
- Singh, R.B. (Eds.) (2001) *Urban Sustainability in the Context of Global Change*, Science Pub., Inc., Enfield (NH), USA and Oxford & IBH Pub., New Delhi.
- Singh, R.B. (Ed.) (2015) *Urban development, challenges, risks and resilience in Asian megacities. Advances in Geographical and Environmental Studies*, Springer

DSE – IV: Field Work and Research Methodology

Course Objectives:

This course is designed to introduce research aptitude among young geographers.

Course Outcomes (COs)

The students will be able to:

- CO-01: Enable students to develop a general understanding of the methodology of research in geography (OBE Level: Apply)
- CO-02: Understand the value of Field Work and Primary Data in geographical research (OBE Level: Analyze)
- CO-03: Encourage students to strengthen the need of interdisciplinary research (OBE Level: Apply)
- CO-04: Inculcate the role of Case Study analysis in the methodology of geography (OBE Level: Create)

Course Work

Unit – I : Fundamentals of Research Literacy

- a) Meaning and objectives of research; types of research (Historical, Case Study, Descriptive and Experimental),
- b) Significance of Research, Ethics in Research and Plagiarism,
- c) Role and Utility of Fieldwork in Geography,
- d) Sources & Types of Data Collection (Reconnaissance, Primary & Secondary)

Unit – II : Approaches to Research

- a) Approach and Methods of Geographic Research,
- b) Ex-post facto, Laboratory Experiments,
- c) Field Study and Experiments, Field Survey Research, d) Evaluation Research and Action Research.

Unit – III : Methods and Field Techniques

- a) Field Techniques in Geography, Selection of Appropriate Technique, Observation (Participant / Non Participant),
- b) Preparation of Questionnaires and Schedules (Open/ Closed / Structured / Non-Structured);
- c) Participatory Rapid Appraisal and Focus Group Discussion
- d) Content Analysis

Unit – IV : Preparation of a Research Report

- a) Designing the Research Report (Documentation Structure, Layout, Fonts, Setting of Maps, Diagrams, Tables , Appendices, Bibliography and Reference)
- b) Review of Literature and Different Methods of In-text and End of Paper Citation,
- c) Style of Citation in Science and Social Science Research(Books, Journals, Reports, Thesis, News Items, Web Sources)

Practical

Field Work and Research Methodology

- a) Preparation of a Observation Schedule (Participant / Non Participant) and Questionnaire (Open/ Closed / Structured / Non-Structured);
- b) Preparation of a Guide Line for Focus Group Discussion and PRA
- c) Field Testing of Questionnaire and FGD-PRA guidelines t on a village level socio-economic study.
- d) Preparation of a Research Report
- e) Viva Voce

Note:

- a) Each student will prepare an individual report based on primary and secondary data collected during field work.
- b) Duration of the field work should not exceed one week
- c) The word count of the report should be around 5000 excluding figures, tables, photographs, maps, references and appendices.
- d) One copy of the report on A 4 size paper should be submitted in soft binding.

Reading Materials

Main Books

1. Majid Hussain (1994), Methodology of Geography, Anmol Publication, New Delhi.
2. K.L.Narasimha Murthy (1999) ,Geographical Research , Concept Publishing Company, New Delhi

Reference Books

1. Research Methodology - Methods and Techniques, Revised Edited by C.R. Kothari (2004), New Age International Publishers, New Delhi.
2. Quantitative Social Research Methods by Kultar Singh (2007), Sage Publication.
3. Social Survey Methods by Paul Nicholas (2009), Oxfarm Publishers Delhi.

OR

Geography Dissertation/ Project Work

A project report may be given in view of discipline specific papers. It is considered as a special course involving application of knowledge solving and exploring a real life situation and difficult problem.

Generic Elective

GE - I: Geography of India

Course Objectives:

This course aims to provide students an overall understanding of India covering its all kind of geographies and resources along with the problems critical to India.

Course Outcomes (COs)

The students will be able to:

CO-01: Review physiographic and climatic characteristics of India (OBE Level: Understand)

CO-02: Assess demographic characteristics of India (OBE Level: Apply)

CO-03: Examine natural resources of India (OBE Level: Analyze)

CO-04: Examine agricultural resources of India (OBE Level: Analyze)

Course-work

Unit I: Physiographic Divisions of India, soil and vegetation, climate (characteristics and classification)

Unit II: Population: Distribution and growth, Demographic structure, Distribution of population by race, religion, language and tribes, urbanization

Unit III: Mineral and power resources: distribution and utilization of iron ore, coal, Petroleum, Natural gas, Nuclear Minerals: Irrigation, Cropping pattern, Production & distribution of rice, wheat, Tea, Coffee

Unit IV: Industrial development: Iron and steel, Aluminum, Automobile and Information technology
Transport in India: Road, Rail and Airways, Waterways

Practical

1. Study and interpretation of topographic Maps
2. Cartograms – Pair-Bar diagram, complex bar, wheel diagram
3. Maps drawing –Simple dot maps, Multiple dot maps
4. Practical record and viva-voce

Reading Materials

Text Book

1. Sharma, T.C. (2013) Economic Geography of India. Rawat Publication, Jaipur
2. Khullar, D. R. India: A Comprehensive Geography

Reading List:

1. Deshpand C. D., 1992: India: A Regional Interpretation, ICSSR, New Delhi
2. Johnson, B. L.C., ed. 2001. Geographical Dictionary of India, Vision Books, New Delhi
4. Sdyasuk Galina and P. Sengupta (1967): Economic Regionalisation of India, Census of India

GE II: Geography of Odisha

Course Objectives:

To provide a broad understanding Odisha covering its geographical aspects and influences

Course Outcomes (COs)

The students will be able to:

- CO-01: Understand the basics of geographies of Odisha (OBE Level: Understand)
- CO-02: Understand the spatial distribution and problems and prospects of agricultural products and minerals in Odisha (OBE Level: Apply)
- CO-03: Assess the resources of Odisha (OBE Level: Analyze)
- CO-04: Evaluate the problems and management of Odisha's (OBE Level: Evaluate)

Course Work

Unit I: Physiography of Odisha: Coastal Plains, Middle Mountainous Region, Western Plateau, River System, Climate, Soil, Natural Vegetation

Unit II: Types of Irrigation, Agriculture: Production and Distribution of Rice, Pulses, Oil seeds, Agricultural Problems and Prospects

Unit III: Minerals and power recourses: (a) Distribution of Iron Ore, Bauxite, Coal & Chromite Iron and steel industry, Aluminum Industry, Cotton Textile

Unit IV: (a) Population: Distribution and Growth, Urbanisation, (b) Transport: Roadways & Railways

Practical

1. Drawing of isopleths maps using rainfall / temperature data
2. Drawing Population Density map of Odisha by Choropleth method
3. Population Pyramid Diagram
4. Construction of Pie diagram
5. Practical Record and Viva-voce (10% of marks)

Reading Materials

Text books

1. Sinha, B. N. - Geography of Odisha

Reading List:

1. Roy, G. C. - Geography of Odisha

GE III: Climatology

Course Objectives:

The course aims to study the nature of climate, the causes and interpretations of its spatial variation and its association with the Earth.

Course Outcomes (COs)

The students will be able to:

- CO-01: Gain knowledge of atmospheric composition, weather and climate dynamics, energy balance processes, global temperature patterns, and temperature inversion phenomena, facilitating comprehension of meteorological principles and their environmental implications. (Knowledge)
- CO-02: Gain understanding of global atmospheric circulation patterns, including pressure systems and wind movements, and their impact on weather phenomena, climate variability, and air transport. (Understanding)
- CO-03: Develop knowledge of atmospheric moisture, condensation processes, cloud and precipitation types, and climate classification methods, enabling interpretation of weather patterns and climatic characteristics for various geographical regions. (Application)
- CO-04: Gain understanding of air mass dynamics, severe weather phenomena, including thunderstorms, tornadoes, and cyclones, and methods of weather forecasting, facilitating analysis of weather patterns and prediction of atmospheric conditions. (Synthesis)

Course Work

Unit I: Composition and Structure of the atmosphere, Insolation and Heat Budget of the Earth, Horizontal distribution of Temperature and associated Factors, Temperature Inversion.

Unit II: Atmospheric Pressure, Pressure Belts of the globe, Planetary Winds, Periodic and local winds.

Unit III: Atmospheric Moisture and Humidity, Forms of Condensation, Fog and Clouds, Precipitation and its Types, Stability and Instability of the atmosphere.

Unit IV: Cyclones – Tropical Cyclones, Extra Tropical Cyclones, Thunderstorm and tornado, Monsoon - Origin and characteristics

Practical

1. Demonstration and use of weather instruments- Maximum & Minimum Thermometer, Barometer, Rain Gauge, Anemometer, Wind Vane
2. Interpretation of Weather Map, Drawing of Climograph.
3. Record & Viva-Voce carries 10% of marks

Reading Materials

Text books

1. Lal, D S (2006): Jalvayu Vigyan, Prayag Pustak Bhavan, Allahabad

Reading List -

1. Barry R. G. and Carleton A. M., 2001: *Synoptic and Dynamic Climatology*, Routledge, UK.
2. Barry R. G. and Corley R. J., 1998: *Atmosphere, Weather and Climate*, Routledge, New York.
3. Critchfield H. J., 1987: *General Climatology*, Prentice-Hall of India, New Delhi
4. Oliver J. E. and Hidore J. J., 2002: *Climatology: An Atmospheric Science*, Pearson Education, New Delhi.
5. Trewartha G. T. and Horne L. H., 1980: *An Introduction to Climate*, McGraw-Hill.
6. Vatal, M (1986): Bhautik Bhugol, Central Book Depot, Allahabad
7. Singh, S (2009): Jalvayu Vigyan, Prayag Pustak Bhawan, Allahabad

GE IV: Human Geography

Course Objectives:

This course is designed to enable students to conduct basic analysis of how economic, political, and cultural processes are shaping human experiences at different geographic scales. The course assists students to interpret how humans are interacting with Earth surface.

Course Outcomes (COs)

The students will be able to:

- CO-01: Describe what human geography is by understand the population dynamics (OBE Level: Apply)
- CO-02: Explore the trend patterns of population characteristics across the globe (OBE Level: Analyze)
- CO-03: Examine demographic characteristics of population (OBE Level: Evaluate)
- CO-04: Evaluate the impact of humans on Earth through Urbanization (OBE Level: Evaluate)

Course Work

Unit I: Meaning and scope of Human Geography; Major Themes; Contemporary Relevance and subfields, Development of human geography

Unit II: Major races of mankind, their characteristics and distribution, Cultural Realms of the world; Religion and Language of World

Unit III: World distribution of population, world Population Growth,, Population Composition; Demographic Transition Theory

Unit IV: Types & Patterns of Rural Settlements; Urban Settlements; Definition, size and functional classification, characteristics, Trends and Patterns of World Urbanization

Practical

1. Population distribution by multiple dots and population density 2.Decadal Population Growth- Time series graphs, bar diagrams
2. Pie Diagram showing occupational structure and population composition
3. Population Projection by A.P and GP method
4. Practical Record and Viva voce

Reading Materials

Text Book

Hussain, Majid (2012) Human Geography. Rawat Publications, Jaipur

Reading List:

1. Hassan, M.I. (2005) Population Geography, Rawat Publications, Jaipur
2. Daniel, P.A. and Hopkinson, M.F. (1989) The Geography of Settlement, Oliver & Boyd, London.
3. Johnston R; Gregory D, Pratt G. et al. (2008) The Dictionary of Human Geography, Blackwell Publication.

4. Jordan-Bychkov et al. (2006) *The Human Mosaic: A Thematic Introduction to Cultural Geography*. W. H. Freeman and Company, New York.
5. Kaushik, S.D. (2010) *Manav Bhugol*, Rastogi Publication, Meerut.
6. Maurya, S.D. (2012) *Manav Bhugol*, Sharda Pustak Bhawan. Allahabad.
7. Hussain, Majid (2012) *Manav Bhugol*. Rawat Publications, Jaipur

Skill Enhancement Elective Course

SEC II: Research Methods in Geography

Course Objectives:

This course aims to provide students an overall understanding of the research methods and how they can use research methods in Geography.

Course Outcomes (Cos)

The students will be able to:

CO-01: Demonstrate the ability to formulate research questions, design research studies, and select appropriate methodologies for data collection and analysis. (OBE Level: Create)

CO-02: Develop skills in conducting literature reviews, synthesizing research findings, and critically evaluating research studies. (OBE Level: Assess)

CO-03: 3. Apply ethical principles in research, including obtaining informed consent, ensuring confidentiality, and avoiding bias in data collection and analysis. (OBE Level: Evaluate)

CO-04: 4. Communicate research findings effectively through written reports, presentations, and other forms of academic writing. (OBE Level: Create)

Course-work

Unit I: Geography Enquiry: Definition and Ethics; Framing Research Questions, Objectives and Hypothesis, Literature Review; Preparing Sample Questionnaire.

Unit II: Data Collection: Type and Sources of Data; Methods of Collection; Input and Editing.

Unit II: Data Analysis: Qualitative Data Analysis: Quantitative Data Analysis: Data Representation Techniques.

Unit IV: Structure of a Research Report: Preliminaries; text; References and Citations

Reading Materials

Main Books

1. Majid Hussain (1994), Methodology of Geography, Anmol Publication, New Delhi.
2. K.L.Narasimha Murthy (1999) ,Geographical Research , Concept Publishing Company, New Delhi

Training & Equipment

Training programs required for under graduate faculty

1. R.S. & G.I.S. with practical modules – 21days
2. Advance cartographic & statistical techniques and its application in Geography.
3. Research methodology and field work in Geography.

Laboratory Equipment Required

1. Desktop - 10
2. Print set - 2
3. Plan meter -
4. Rota meter -
5. Toposheets -
6. Satellite image-
7. Aerial photograph-
8. Stereoscope
9. Parallax Bar
10. Tracing Table
11. GPS (Garmin) - 5
12. Clinometers Compass

Student Project

1. Environment
2. Rural Development
3. Urban studies
4. Natural Hazards