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**SUMMARY**  
**OF SCHEME OF EXAMINATION, CREDIT SYSTEM, NUMBER OF TEACHING HOURS**  
**AND ASSESSMENT CRITERIA FOR M. A. / M. Sc. In GEOGRAPHY**

Semesters	Course Title	Nature	Course Code	Credit			Teaching Hours (Per week)			Assessment				
				L/T	L/F	Total	L/T	L/F	Total	T1/T2	M. S.	E. S.	Total	
<b>SEMESTER - I</b>	Part – A: Theory Courses				L/T	L/F	Total	L/T	L/F	Total	T1/T2	M. S.	E. S.	Total
	Advanced Geomorphology	Core (Physical)	GEO – 501 [S1-I-C]	04	-	04	04	-	04	20	20	60	100	
	Geographical Thought	Core (Human)	GEO – 502 [S1-II-C]	04	-	04	04	-	04	20	20	60	100	
	India	Core (Regional)	GEO – 503 [S1-III-C]	04	-	04	04	-	04	20	20	60	100	
	North America	Elective	GEO – 551 [S1-IV-E1]	04	-	04	04	-	04	20	20	60	100	
	South America		GEO – 552 [S1-IV-E2]											
	Part – B: Practical										V.V. & Record	Survey	Desk Work	
Practical	Lab	GEO – 531 [S1-V-L]	04	02	06	04	04	08	20	20	60	100		
<b>TOTAL</b>				<b>20</b>	<b>02</b>	<b>22</b>	<b>20</b>	<b>04</b>	<b>24</b>	<b>100</b>	<b>100</b>	<b>300</b>	<b>500</b>	
<b>SEMESTER – II</b>	Part –A: Theory Courses													
	Advance Climatology	Core (Physical)	GEO – 504 [S2-I-C]	04	-	04	04	-	04	20	20	60	100	
	Urban Geography	Core (Human)	GEO – 505 [S2-II-C]	04	-	04	04	-	04	20	20	60	100	
	Population Geography	Core (Systematic)	GEO – 506 [S2-III-C]	04	-	04	04	-	04	20	20	60	100	
	West Asia	Elective	GEO – 553 [S2-IV-E1]	04	-	04	04	-	04	20	20	60	100	
	East Asia		GEO – 554 [S2-IV-E2]											
	Part – B: Practical										V.V. & Record	Survey	Desk Work	
Practical	Lab	GEO – 532 [S2-V-L]	04	02	06	04	04	08	20	20	60	100		
<b>TOTAL</b>				<b>20</b>	<b>02</b>	<b>22</b>	<b>20</b>	<b>04</b>	<b>24</b>	<b>100</b>	<b>100</b>	<b>300</b>	<b>500</b>	

Semesters	Course Title	Nature	Course Code	Credit			Teaching Hours (Per week)			Assessment				
				L/T	L/F	Total	L/T	L/F	Total	T1/T2	M. S.	E. S.	Total	
<b>SEMESTER – III</b>	<b>Part –A: Theory Courses</b>				L/T	L/F	Total	L/T	L/F	Total	T1/T2	M. S.	E. S.	Total
	<b>Oceanography</b>	Core (Physical)	GEO – 507 [ S3-I-C ]	04	-	04	04	-	04	20	20	60	100	
	<b>Agriculture Geography</b>	Core (Human)	GEO – 508 [S3-II-C ]	04	-	04	04	-	04	20	20	60	100	
	<b>Industrial Geography</b>	Core (Systematic)	GEO – 509 [S3-III-C]	04	-	04	04	-	04	20	20	60	100	
	<b>Africa</b>	Elective	GEO – 555 [S3-IV-E1]	04	-	04	04	-	04	20	20	60	100	
	<b>Australia</b>		GEO – 556 [S3-IV-E2]											
	<b>Part – B: Practical</b>										V.V. & Record	Survey	Desk Work	
	Practical	Lab	GEO – 533 [S3-V-L ]	04	02	06	04	04	08	20	20	60	100	
<b>TOTAL</b>				<b>20</b>	<b>02</b>	<b>22</b>	<b>20</b>	<b>04</b>	<b>24</b>	<b>100</b>	<b>100</b>	<b>300</b>	<b>500</b>	
<b>SEMESTER – IV</b>	<b>Part –A: Theory Courses</b>				L/T	L/F	Total	L/T	L/F	Total	T1/T2	M. S.	E. S.	Total
	<b>Environmental Geography</b>	Core (Physical)	GEO – 510 [ S4-I-C ]	04	-	04	04	-	04	20	20	60	100	
	<b>Political Geography</b>	Core (Human)	GEO – 511 [S4-II-C ]	04	-	04	04	-	04	20	20	60	100	
	<b>Urban &amp; Regional Planning</b>	Core (Systematic)	GEO – 512 [S4-III-C ]	04	-	04	04	-	04	20	20	60	100	
	<b>West Europe</b>	Elective	GEO – 557 [S4-IV-E1]	04	-	04	04	-	04	20	20	60	100	
	<b>East Europe</b>		GEO – 558 [S4-IV-E2]											
	<b>Part – B: Practical</b>										Project	V. V.	Desk Work	
	GEO – 534 [S4-V-L ]	Lab	<b>Practical</b>	04	02	06	04	04	08	20	20	60	100	
<b>TOTAL</b>				<b>20</b>	<b>02</b>	<b>22</b>	<b>20</b>	<b>04</b>	<b>24</b>	<b>100</b>	<b>100</b>	<b>300</b>	<b>500</b>	
<b>GRAND TOTAL</b>				<b>80</b>	<b>08</b>	<b>88</b>	<b>80</b>	<b>16</b>	<b>96</b>	<b>400</b>	<b>400</b>	<b>1200</b>	<b>2000</b>	

**Abbreviations:**

L/T=Lecture/Tutorials; L/F= Lab/Field Survey; T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

**Note:** In addition to the number of hours mentioned in the table above, time has been provided for library study, self-study planning etc.

**SCHEME OF EXAMINATION, CREDIT SYSTEM, NUMBER OF TEACHING HOURS  
AND ASSESSMENT CRITERIA FOR  
M. A. / M. Sc. In GEOGRAPHY**

**SEMESTER – I**

**THEORY CREDITS: 16**

**PRACTICAL CREDITS: 06**

**TOTAL CREDITS IN THE SEMESTER: 22**

Course Title	Nature	Course code	Credit			Teaching Hours (Per week)			Assessment			
			L/T	L/F	Total	L/T	L/F	Total	T1/T2	M. S.	E. S.	Total
<b>Part –A: Theory Courses</b>												
<b>Advance Geomorphology</b>	Core (Physical)	GEO – 501 [S1-I-C]	04	-	04	04	-	04	20	20	60	100
<b>Geographical Thought</b>	Core (Human)	GEO – 502 [S1-II-C]	04	-	04	04	-	04	20	20	60	100
<b>India</b>	Core (Systematic)	GEO – 503 [S1-III-C]	04	-	04	04	-	04	20	20	60	100
<b>North America</b>	Elective	GEO – 551 [S1-IV-E1]	04	-	04	04	-	04	20	20	60	100
<b>South America</b>		GEO – 552 [S1-IV-E2]										
<b>Part – B: Practical</b>									<b>V.V. &amp; Record</b>	<b>Survey</b>	<b>Desk Work</b>	
<b>GEO – 531 [S1-V-L]</b>	Lab	Practical	04	02	06	04	04	08	20	20	60	100
<b>TOTAL</b>			<b>20</b>	<b>02</b>	<b>22</b>	<b>20</b>	<b>04</b>	<b>24</b>	<b>100</b>	<b>100</b>	<b>300</b>	<b>500</b>

**Abbreviations:**

**L/T**=Lecture/Tutorials; **L/F**= Lab/Field Survey; **T1/T2** = Internal Assessment Tests; **M. S.** = Mid Semester Test; **E. S.** = End Semester Exam

**Note:** In addition to the number of hours mentioned in the table above, time has been provided for library study, self-study planning etc.

## FIRST PAPER

### GEO - 501 [S1 – I – C]: Advanced Geomorphology (Core – Physical)

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit.

#### UNIT I

Methods and approaches to the study of landforms; Basic concepts in geomorphology: Structures, Processes and Scales (Stage/Time); Theories of landscape development.

#### UNIT II

Concept of Plate tectonics; Mass movement of rock waste and resultant landforms; Concept, Evolution and Classification slopes; Theories of slope development.

#### UNIT III

Fluvial (Process) Geomorphology – Morphometry of drainage basins; Profile of equilibrium; Channel morphology; Climatic Geomorphology and Morphogenetic regions.

#### UNIT IV

Structural Geomorphology–Fold, Fault and Domal Structures and Landforms; Palaeo and Neo–Geomorphology – Denudation Chronology of peninsular India and Himalayas.

## SECOND PAPER

### GEO - 502 [S1 – II – C]: Geographical Thought (Core – Human)

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit. The purpose of this course is to inculcate self reading and the teachers are required to motivate the students towards that end.

#### UNIT I

Development of Geography in second half of the 20<sup>th</sup> century; Concept of Paradigm; Paradigm shift, Positivism & Logical Positivism, Quantitative Revolution, Models, System Analysis in Geography.

#### UNIT II

Reactions to Quantitative Revolution, Behavioural Geography – Cognition, Perception, Mental Maps, Decision making and Behaviour, Time – Space Geography, Humanistic Geography – Idealist & Phenomenological Approaches.

#### UNIT III

Radical Geography, Structuralism, Realism, Functionalism, Welfare Geography, Post – Modernism.

#### UNIT IV

Modern Developments, Applied Geography and Relevance Debate, Spatial Inequality and Regional Imbalances, Geographers and Policy, Regional Planning, Feminist Geography, Future of Geography.

## THIRD PAPER

### GEO - 503 [S1 – III – C]: India (Core – Regional)

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit.

#### UNIT I

Physiographical & Structural Regions of India; Indian Monsoon – Origin, Pattern & Forecast; Floristic Regions; Forest products: Classification of Indian soil; Problems – soil erosion and conservation; National Forest & Soil Policy.

#### UNIT II

Indian Agriculture; Crop Production & Pattern; New Trends – Dry land farming, Green – White Revolutions, Eco-Farming; Agro-Climatic & Agro-Ecological Regions; Conventional and Non-Conventional Energy – Production & Distribution; Distribution and Production of mineral resources; locational factors of Indian Industries; Industrial Regions.

#### UNIT III

Urban & Rural Settlements – Types, & Patterns; Urbanisation in India, Primate City, Functional Classification, Urban Morphology; Problems of Rural – Urban Settlements; National Policies & Programmes; Origin and Dispersal of Races in India; Cultural heaths & regions; Major Tribes – Distribution and Classification.

#### UNIT IV

Five year planning in India: Achievements and Failures; Multi-Level Planning: Planning at National, State, District, Block and Panchayat level; Planning Regions – Bases of delimitation & Classification.

## FOURTH PAPER

### GEO - 551 [S1 – IV – E1]: North America (Elective 'E1')

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit. The purpose of this course is to inculcate self reading and the teachers are required to motivate the students towards that end.

#### UNIT I

Location, Physiographic Regions; Drainage Network; Climatic, Soil and Vegetative – Characteristics and Divisions.

#### UNIT II

Salient Economic Features; Agricultural, Mineral, Energy and Industrial Resources and spatial Pattern.

#### UNIT III

Salient Demographic Features; Demographic Growth, migration & spatial patterns; Ethnic composition and spatial patterns – language, religion and culture; Major Tribes – Distribution and Classification.

#### UNIT IV

Geographical study of U. S. A., Canada & Mexico.



## FOURTH PAPER

### GEO - 552 [S1 – IV – E2]: South America (Elective 'E2')

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit. The purpose of this course is to inculcate self reading and the teachers are required to motivate the students towards that end.

#### UNIT I

Location, Physiographic Regions; Drainage Network; Climatic, Soil and Vegetative – Characteristics and Divisions.

#### UNIT II

Salient Economic Features; Agricultural, Mineral, Energy and Industrial Resources and spatial Pattern.

#### UNIT III

Salient Demographic Features; Demographic Growth, migration & spatial patterns; Ethnic composition and spatial patterns – language, religion and culture; Major Tribes – Distribution and Classification.

#### UNIT IV

Geographical study of Brazil, Argentina & Venezuela

## FIFTH PAPER

### GEO - 531 [S1 – V – L]: Practical (Lab)

T1/T2	M. S.	E. S.	Total
20	20	60	100

**Record & V. V.** = Internal Assessment Tests; **F. S.** = Mid Semester Test; **L. S.** = Desk Work Exam

### LABORATORY & FIELD WORK EXAMINATION

**Time: 3 hours**  
**Time: 3 hours**

**Maximum Marks: 60**  
**Maximum Marks: 20**

The Syllabi for practical is divided into two sections, Section – A is related to laboratory work, and Section – B is related to Field Work (Surveying). The practical examination including field work examination under section A and B will be of six hours duration divided into two parts of three hours each. The division of marks in practical shall be as given below:-

<b>Laboratory Work</b>	<b>M.M. 60</b>
<b>Field Work</b>	<b>M.M. 20</b>
<b>Record &amp; Viva voce</b>	<b>M.M. 20</b>

The laboratory work is divided into three units. Exercises will be set selecting at least one exercise from each unit. Candidate will have to attempt exercises selecting at least one exercise from each unit.

The field work examination will be of three hours duration in which exercises will be given on surveying.

### SECTION – A: LABORATORY WORK

#### UNIT – I: Cartography:

1. **Earth and its coordinate System:** Definition and classification of projections; Mathematical construction and characteristics of Polar Zenithal Gnomonic, Polar Zenithal Stereographic and Polar Zenithal Orthomorphic Projections.
2. **Point Map and Graded circle map**

#### UNIT – II: Spatial Statistical Techniques:

1. **Analysis of Drainage Network Pattern:** Drainage Network-bifurcation ratio, length ratio, drainage density, drainage texture, Stream Frequency;

2. **Altimetric Analysis:** Relative Relief, Dissection Index and Analysis of Average Slope; Area-Height diagram, Hypsometric curve, clinograph.

### **UNIT – III: Physics of Remote Sensing & Digital Data Analysis:**

1. **Basics of Remote Sensing:** Stages of Remote Sensing, Electromagnetic Radiation, Spectral Regions, Atmospheric windows, Radiation quantities, Radiation laws, Platforms & Sensors and their spatial, spectral, temporal & radiometric resolutions.
2. Types of matrices, Simple arithmetic operations, Simultaneous equation through matrix.

### **SECTION – B: FIELD WORK**

1. **Surveying: Planimetric details** - Graphic triangulation, plotting of details by plane table and Resection: two and three point problems.

**SCHEME OF EXAMINATION, CREDIT SYSTEM, NUMBER OF TEACHING HOURS  
AND ASSESSMENT CRITERIA FOR  
M. A. / M. Sc. In GEOGRAPHY**

**SEMESTER – II**

**THEORY CREDITS: 16**

**PRACTICAL CREDITS: 06**

**TOTAL CREDITS IN THE SEMESTER: 22**

Course code	Nature	Course Title	Credit			Teaching Hours (Per week)			Assessment			
			L/T	L/F	Total	L/T	L/F	Total	T1/T2	M. S.	E. S.	Total
<b>Part –A: Theory Courses</b>												
<b>GEO – 504</b> [ S2-I-C ]	Core (Physical)	Advance Climatology	04	-	04	04	-	04	20	20	60	100
<b>GEO – 505</b> [ S2-II-C ]	Core (Human)	Urban Geography	04	-	04	04	-	04	20	20	60	100
<b>GEO – 506</b> [ S2-III-C ]	Core (Systematic)	Population Geography	04	-	04	04	-	04	20	20	60	100
<b>GEO – 553</b> [ S2-IV-E1 ]	Elective	West Asia	04	-	04	04	-	04	20	20	60	100
<b>GEO – 554</b> [ S2-IV-E2 ]		East Asia										
<b>Part – B: Practicals</b>									<b>V.V. &amp; Record</b>	Survey	Desk Work	
<b>GEO – 532</b> [ S2-V-L ]	Lab	Practical	04	02	06	04	04	08	20	20	60	100
<b>TOTAL</b>			20	02	22	20	04	24	100	100	300	500

**Abbreviations:**

**L/T**=Lecture/Tutorials; **L/F**= Lab/Field Survey; **T1/T2** = Internal Assessment Tests; **M. S.** = Mid Semester Test; **E. S.** = End Semester Exam

**Note:** In addition to the number of hours mentioned in the table above, time has been provided for library study, self-study planning etc.

## FIRST PAPER

### GEO - 504 [S2 – I – C]: Advanced Climatology (Core – Physical)

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit.

#### UNIT I

Meaning and scope of Climatology; Composition and Structure of Atmosphere; Radiation Laws – Wave, Particle, Stefans-Boltzman & Weins Law; Solar Constant; Process of Precipitation; Adiabatic temperature change and Gas Law; Stability and instability; Theories of origin of precipitation and related forms;

#### UNIT II

Air masses – Origin, growth, classification and distribution. Fronts and frontogenesis; Cyclones and anticyclones – Theories about the origin of temperate cyclones; Origin of Indian Monsoon; Upper air circulation and jet stream;

#### UNIT III

Climatic Classification of Koppen, Thornthwaite and Strahler; Major climate types and biomes; Weather analysis and Weather forecasting; Weather and human behaviour; Weather modification.

#### UNIT IV

Climatic change – Causes and theories; Global warming – Evidences, causes and effects; Atmospheric Hazards and Disasters – Tropical Cyclones, tornadoes, thunderstorms and cloud-bursts; El-Nino, La-Nina, Walker Circulation, Southern Oscillation.

## SECOND PAPER

### GEO - 505 [S2 – II – C]: Urban Geography (Core – Human)

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

**Time: 3 hours**

**Maximum Marks: 60**

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit.

#### UNIT I

Meaning, scope, approaches of study & Development of Urban Geography: Theories of urban origin: early urban hearths, the forms of post-modern city; Urban development model - cycle and stages; Types of urbanised regions.

#### UNIT II

National urban systems; Functional typology; Central place theory; urban settlement spread theories; Urban hierarchy, Rank size rule and its applicability.

#### UNIT III

Ecological models of Burgess, Hoyt, Harris and Ullman, Manu, Vance and White; Internal structure of city in South Asia,; Rural – urban fringe; Concept of city region and its delimitation.

#### UNIT IV

Third world urbanization and Theories of urbanization, peripheral, exo and implosion urbanisation, Urban economy and informal sector in Third world city; Third world urban problems, Concept of garden city and new town.

## THIRD PAPER

### GEO - 506 [S2 – III – C]: Population Geography (Core – Systematic)

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

#### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit. The purpose of this course is to inculcate self reading and the teachers are required to motivate the students towards that end.

#### UNIT I

Nature and scope of population geography; Sources of population data; Methodological problems; Recent developments in population geography; Development of population geography in India;

#### UNIT II

Population growth and distribution – Classical and modern theories; World patterns and their determinants; Concepts of 'under', 'over' and 'optimum' population; Population composition.

#### UNIT III

Population Dynamics – Measurement of fertility and mortality; Migration – Causes, types, national and international patterns, rural and urban dimensions.

#### UNIT – IV

Population-Resource regions; Population planning; Population policies in under-developed and developed countries; Population and socio-economic development; Population and human resource; Human development index.

## FOURTH PAPER

### GEO - 553 [S2 – IV – E1]: West Asia (Elective 'E1')

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

**Time: 3 hours**

**Maximum Marks: 60**

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit. The purpose of this course is to inculcate self reading and the teachers are required to motivate the students towards that end.

#### UNIT I

Location, Physiographic Regions; Drainage Network; Climatic, Soil and Vegetative – Characteristics and Divisions.

#### UNIT II

Salient Economic Features; Agricultural, Mineral, Energy and Industrial Resources and spatial Pattern.

#### UNIT III

Salient Demographic Features; Demographic Growth, migration & spatial patterns; Ethnic composition and spatial patterns – language, religion and culture; Major Tribes – Distribution and Classification.

#### UNIT IV

Geographical study of China & Japan.



## FOURTH PAPER

### GEO - 554 [S2 – IV – E2]: East Asia (Elective 'E2')

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit. The purpose of this course is to inculcate self reading and the teachers are required to motivate the students towards that end.

#### UNIT I

Location, Physiographic Regions; Drainage Network; Climatic, Soil and Vegetative – Characteristics and Divisions.

#### UNIT II

Salient Economic Features; Agricultural, Mineral, Energy and Industrial Resources and spatial Pattern.

#### UNIT III

Salient Demographic Features; Demographic Growth, migration & spatial patterns; Ethnic composition and spatial patterns – language, religion and culture; Major Tribes – Distribution and Classification.

#### UNIT IV

Geographical study of Iraq & Iran

## FIFTH PAPER

### GEO - 532 [S2 – V – L]: Practical (Lab)

T1/T2	M. S.	E. S.	Total
20	20	60	100

**Record & V. V.** = Internal Assessment Tests; **F. S.** = Mid Semester Test; **L. S.** = Desk Work Exam

### LABORATORY & FIELD WORK EXAMINATION

**Time: 3 hours**

**Maximum Marks: 60**

**Time: 3 hours**

**Maximum Marks: 20**

The Syllabi for practical is divided into two sections, Section – A is related to laboratory work, and Section – B is related to Field Work (Surveying). The practical examination including field work examination under section A and B will be of six hours duration divided into two parts of three hours each. The division of marks in practical shall be as given below:-

Laboratory Work	M.M. 60
Field Work	M.M. 20
Record & Viva voce	M.M. 20

The laboratory work is divided into three units. Exercises will be set selecting at least one exercise from each unit. Candidate will have to attempt exercises selecting at least one exercise from each unit.

The field work examination will be of three hours duration in which exercises will be given on surveying.

### SECTION – A: LABORATORY WORK

#### UNIT – I: Cartography:

- Earth and its coordinate System:** Mathematical construction and characteristics of Conical Two Standard, Bonne's and Polyconic Projections.
- Choropleth and Isopleth Mapping.**

#### UNIT – II: Spatial Statistical Techniques:

1. **Analysis of Population Data:** methods of data collection and compilation –census, sample survey; Analysis of point pattern: Mean-centre standard deviation, nearest neighbour analysis, quadrant counts method, population potential.
2. **Analysis of line Network:** Transport network – cyclometric number, L.B.V. index;

#### **UNIT – III: Digital Satellite Image & Digital Data Analysis:**

3. **Digital Image Processing:** Definition, satellite imagery, structure of digital image, digital data formats – BSQ, BIP & BIL, advantages of digital image, hard & soft copy, Digitization - conversion of hard copy to soft copy.
4. **Digital Image Enhancement:** Methods of Contrast Enhancements: Linear and Non – linear Contrast Enhancement technique, Histogram Equalization and Band Ratioing.

#### **SECTION – B: FIELD WORK**

2. **Surveying: Planimetric and Altimetric details-** Establishment of Bench mark and spot heights, Profiling by Level, Telescopic Alidade and plane table.

**SCHEME OF EXAMINATION, CREDIT SYSTEM, NUMBER OF TEACHING HOURS  
AND ASSESSMENT CRITERIA FOR  
M. A. / M. Sc. In GEOGRAPHY**

**SEMESTER – III**

**THEORY CREDITS: 16**

**PRACTICAL CREDITS: 06**

**TOTAL CREDITS IN THE SEMESTER: 22**

Course Title	Nature	Course Code	Credit			Teaching Hours (Per week)			Assessment			
			L/T	L/F	Total	L/T	L/F	Total	T1/T2	M. S.	E. S.	Total
<b>Part –A: Theory Courses</b>												
<b>Advance Oceanography</b>	Core (Physical)	GEO – 507 [S3-I-C]	04	-	04	04	-	04	20	20	60	100
<b>Agriculture Geography</b>	Core (Human)	GEO – 508 [S3-II-C]	04	-	04	04	-	04	20	20	60	100
<b>Industrial Geography</b>	Core (Sytematic)	GEO – 509 [S3-III-C]	04	-	04	04	-	04	20	20	60	100
<b>Africa</b>	Elective	GEO – 555 [S3-IV-E1]	04	-	04	04	-	04	20	20	60	100
<b>Australia</b>		GEO – 556 [S3-IV-E2]										
<b>Part – B: Practical</b>									<b>V.V. &amp; Record</b>	Survey	Desk Work	
<b>Practical</b>	Lab	GEO – 533 [S3-V-L]	04	02	06	04	04	08	20	20	60	100
<b>TOTAL</b>			<b>20</b>	<b>02</b>	<b>22</b>	<b>20</b>	<b>04</b>	<b>24</b>	<b>100</b>	<b>100</b>	<b>300</b>	<b>500</b>

**Abbreviations:**

**L/T**=Lecture/Tutorials; **L/F**= Lab/Field Survey; **T1/T2** = Internal Assessment Tests; **M. S.** = Mid Semester Test; **E. S.** = End Semester Exam

**Note:** In addition to the number of hours mentioned in the table above, time has been provided for library study, self-study planning etc.

## FIRST PAPER

### GEO - 507 [S3 – I – C]: Advanced Oceanography (Core – Physical)

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit.

#### Unit – I: Oceanography and Geophysical aspects of Oceans

Definition and scope of Oceanography; Historical development of oceanography; Distributional patterns of land and oceans; Plate tectonics and origin of oceans; Depth zones and Hypsometric Curve; Submarine canyons; Bottom relief of oceans; Ocean Deposits.

#### Unit – II: Properties of Ocean Waters

Chemical composition of ocean waters; Temperature of sea-waters; Salinity of sea-waters; Sea-water density and water masses; Sea Waves; Tides: origin, types and prediction; Oceanic Currents: Causes and Controlling factors, General Patterns of Circulation; El Nino and La Nina;

#### Unit – III: Marine Ecology

Oceans as Ecosystems; Marine Biota; Zonation of the sea; Energy flow: Food Chains and Food Webs; Mangroves and Estuarine Ecology; Coral Reefs: Formation, distribution, importance and bleaching; Marine Pollution; Climate change and Marine Ecosystem.

#### Unit – IV: Oceanic Resources

Classification of oceanic resources; Mineral resources; Energy resources; Food resources; Aquaculture and sericulture, Depletion of marine resources; Management, and conservation of marine resources; Indian marine and submarine explorations.

## SECOND PAPER

### GEO - 508 [S3 – II – C]: Agricultural Geography (Core – Human)

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit.

#### UNIT I

Meaning, scope, & Development of Agricultural Geography; Approaches of study – commodity, systematic, regional and systems; Origin and dispersal of agriculture – major agricultural hearths; Diffusion of agricultural innovations..

#### UNIT II

Determinants of agriculture- physical, economic, political, technological, socio-cultural; land reforms, land use survey; Selected agricultural concepts and their measurements – cropping pattern, crop concentration, cropping intensity, degree of commercialisation, diversification and specialization, efficiency and productivity; crop combination regions;

#### UNIT III

Theories of agricultural location: Von Thunen's model and its modification – Sinclair's approach; Concept of agricultural region: Whittlesey's classification of agricultural regions; Agricultural typology Agro-climatic regions of India; Land use and land capability classification.

#### UNIT IV

Land use and shifting cropping pattern; new trends in Indian agriculture – Green revolution, white revolution; Food deficit and food surplus regions; Nutritional index; Problems & Policies of Indian agriculture; Agriculture and environmental degradation.

## THIRD PAPER

### GEO - 509 [S3 – III – C]: Industrial Geography (Core – Systematic)

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit. The purpose of this course is to inculcate self reading and the teachers are required to motivate the students towards that end.

#### UNIT I

Nature, scope and recent developments in industrial geography; Factors of industrial location; Centralization and decentralization of industries; Horizontal, vertical and diagonal linkages of modern industries.

#### UNIT II

Theories and models of industrial location: Weber, Losch, Isard and Hoover; Distribution and spatial pattern of major industries Major industrial regions of the world.

#### UNIT III

Historical review of Indian industrialisation since 1947; Evolution of industrial regions in India; Development of small scale and cottage industries; Multinational corporations and India's industrial scenario; Industrial policy of India.

#### UNIT IV

Problems of industrial development; Industrial development and environmental degradation; Industries and economic development; Impact of globalisation on industrial development; Industrial decentralization and its impact on urban fringe; Changing industrial policy.

## FOURTH PAPER

### GEO - 555 [S3 – IV – E1]: Africa (Elective 'E1')

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit. The purpose of this course is to inculcate self reading and the teachers are required to motivate the students towards that end.

#### UNIT I

Location, Physiographic Regions; Drainage Network; Climatic, Soil and Vegetative – Characteristics and Divisions.

#### UNIT II

Salient Economic Features; Agricultural, Mineral, Energy and Industrial Resources and spatial Pattern.

#### UNIT III

Salient Demographic Features; Demographic Growth, migration & spatial patterns; Ethnic composition and spatial patterns – language, religion and culture; Major Tribes – Distribution and Classification.

#### UNIT IV

Geographical study of Egypt, Sudan and South Africa



## FOURTH PAPER

### GEO - 556 [S3 – IV – E2]: Australia (Elective 'E2')

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit. The purpose of this course is to inculcate self reading and the teachers are required to motivate the students towards that end.

#### UNIT I

Location, Physiographic Regions; Drainage Network; Climatic, Soil and Vegetative – Characteristics and Divisions.

#### UNIT II

Salient Economic Features; Agricultural, Mineral, Energy and Industrial Resources and spatial Pattern.

#### UNIT III

Salient Demographic Features; Demographic Growth, migration & spatial patterns; Ethnic composition and spatial patterns – language, religion and culture; Major Tribes – Distribution and Classification.

#### UNIT IV

Geographical study of important Australian State

## FIFTH PAPER

### GEO - 533 [S3 – V – L]: Practical (Lab)

T1/T2	M. S.	E. S.	Total
20	20	60	100

**Record & V. V.** = Internal Assessment Tests; **F. S.** = Mid Semester Test; **L. S.** = Desk Work Exam

### LABORATORY & FIELD WORK EXAMINATION

**Time: 3 hours**

**Maximum Marks: 60**

**Time: 3 hours**

**Maximum Marks: 20**

The Syllabi for practical is divided into two sections, Section – A is related to laboratory work, and Section – B is related to Field Work (Surveying).

The practical examination including field work examination under section A and B will be of six hours duration divided into two parts of three hours each. The division of marks in practical shall be as given below:-

<b>Laboratory Work</b>	<b>M.M. 60</b>
<b>Field Work</b>	<b>M.M. 20</b>
<b>Record &amp; Viva voce</b>	<b>M.M. 20</b>

The laboratory work is divided into three units. Exercises will be set selecting at least one exercise from each unit. Candidate will have to attempt exercises selecting at least one exercise from each unit.

The field work examination will be of three hours duration in which exercises will be given on surveying.

### SECTION – A: LABORATORY WORK

#### UNIT – I: Cartography:

- 5. Earth and its coordinate System:** Mathematical construction and characteristics of Sinusoidal, Gall's, Mercator's Projections.
- 6. Map Reference System**

#### UNIT – II: Spatial Statistical Techniques:

3. **Analysis of Spatial Data:** Scatter diagram, correlation by Spearman's Rank Difference and Karl Pearson's Product Moment Methods, regression residuals;
4. **Sources and Distribution of Data:** Theory of probabilities of distribution; Sampling – Sampling frame and procedure, standard error and sample size.

#### UNIT – III: Digital Satellite Image & Digital Data Analysis:

5. **Digital Image Rectification:** Definition, Types of errors in satellite images: Scan line dropouts, scan line banding, scan line offsets, atmospheric corrections, geometric corrections – systematic, non-systematic.
6. **Digital Image Enhancement:** Spatial Digital Data Filtering – Concepts of use of Filters, Types of filters and their uses; Standardization of Digital Data Matrix, Correlation of Digital Data Matrix.

#### SECTION – B: FIELD WORK

1. **Surveying: Planimetric and Altimetric details:**
  - A. Surveying by Indian Clinometer & Plain Table  
(Traversing contours by Indian Clinometer)
  - B. Surveying by Theodolite and Chain – Tape  
(Angular measurement by Theodolite)

**SCHEME OF EXAMINATION, CREDIT SYSTEM, NUMBER OF TEACHING HOURS  
AND ASSESSMENT CRITERIA FOR  
M. A. / M. Sc. In GEOGRAPHY**

**SEMESTER – IV**

**THEORY CREDITS: 16**

**PRACTICAL CREDITS: 06**

**TOTAL CREDITS IN THE SEMESTER: 22**

Course code	Nature	Course Title	Credit			Teaching Hours (Per week)			Assessment			
			L/T	L/F	Total	L/T	L/F	Total	T1/T2	M. S.	E. S.	Total
<b>Part -A: Theory Courses</b>												
<b>Environmental Geography</b>	Core (Physical)	GEO – 510 [S4-I-C]	04	-	04	04	-	04	20	20	60	100
<b>Political Geography</b>	Core (Human)	GEO – 511 [S4-II-C]	04	-	04	04	-	04	20	20	60	100
<b>Urban &amp; Regional Planning</b>	Core (Systematic)	GEO – 512 [S4-III-C]	04	-	04	04	-	04	20	20	60	100
<b>West Europe</b>	Elective	GEO – 557 [S4-IV-E1]	04	-	04	04	-	04	20	20	60	100
<b>East Europe</b>		GEO – 558 [S4-IV-E2]										
<b>Part - B: Practical</b>									<b>Project</b>	V. V.	Desk Work	
<b>Practical</b>	Lab	GEO – 534 [S4-V-L]	04	02	06	04	04	08	20	20	60	100
<b>TOTAL</b>			<b>20</b>	<b>02</b>	<b>22</b>	<b>20</b>	<b>04</b>	<b>24</b>	<b>100</b>	<b>100</b>	<b>300</b>	<b>500</b>

**Abbreviations:**

**L/T**=Lecture/Tutorials; **L/F**= Lab/Field Survey; **T1/T2** = Internal Assessment Tests; **M. S.** = Mid Semester Test; **E. S.** = End Semester Exam

**Note:** In addition to the number of hours mentioned in the table above, time has been provided for library study, self-study planning etc.

## FIRST PAPER

### GEO - 510 [S4 – I – C]: Environmental Geography (Core – Physical)

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question no. 1 will be compulsory and short note type consisting of four topics – one from each unit. The remaining eight questions will be from four units- two from each unit. The candidate will be required to attempt one question from each unit.

#### UNIT I

Meaning and Scope of environmental geography; Basic principles of environmental geography; Composition and types of environment; Ecological principles; Man – environment relationship.

#### UNIT II

Ecosystem: concept and components; Trophic levels; Food chains and food webs; Energy flow in the ecosystem; Circulation of matter in the ecosystem, geobiochemical cycle, ecosystem productivity, ecosystem stability.

#### UNIT III

Environmental degradation; Extreme events, hazards and disasters (earthquake, volcanoes, cyclones, floods); Environmental pollution (air, water, solid waste, soil and noise pollution); Environmental pollution in India; Environmental Problems – global warming, ozone depletion, land degradation, reduction in biodiversity.

#### UNIT IV

Environmental management: concept and approaches; Environmental dimension in planning – sustainable development; Environmental consciousness, Environmental policy; environmental legislation; Environmental impact assessment; Disaster management.

## SECOND PAPER

### GEO - 511 [S4 – II – C]: Political Geography (Core – Human)

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

#### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question no. 1 will be compulsory and short note type consisting of four topics – one from each unit. The remaining eight questions will be from four units- two from each unit. The candidate will be required to attempt one question from each unit.

#### UNIT I

Meaning, scope, approaches of study & Development of Political Geography; Major schools of thought; Concept of state and nation; Spatial factors of state; Buffer state, core area, ecumene, capital city, frontiers and boundaries.

#### UNIT II

Concepts of geo-strategy; World geopolitics in changing perspectives- colonialism to federalism; Geostrategic ideas of Mahan, Mackinder, Spyman, Cohen and Seversky and their relevance in the modern world.

#### UNIT III

Geopolitical significance of the Indian Ocean; Role of third world countries; Political geography and regional co-operation; Geopolitical study of USA, SE Asia, S. W. Asia, S. Asia and Africa.

#### UNIT IV

Nature and scope of electoral geography; Geography of elections with special reference to India; Changing political map of India; Interstate issues; Insurgency in border states; Emergence of new states.

## THIRD PAPER

### GEO - 512 [S4 – III – C]: Urban & Regional Planning (Core – Systematic)

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit. The purpose of this course is to inculcate self reading and the teachers are required to motivate the students towards that end.

#### UNIT I

Concept of regional planning; Types of regional planning; City as unit of regional planning; Approaches to regional planning; Historical development of regional planning- -Developed and Developing world.

#### UNIT II

Methodology and techniques of regional planning; Analytical techniques and procedural techniques; Principles of rationalisation; Indicators of development and their data sources; Measures of regional development and regional disparities; Planning processes- Sectoral and spatial planning; short-term and long-term perspective planning; Multi regional and multilevel planning.

#### UNIT III

Regional development strategies: Export base theory, convergence theory, Growth poles and growth centres in regional development; Industrial dispersal and backward area development; Identification of planning regions; Regional planning strategies for backward areas-- drought prone area, hill area, tribal area and rural area.

#### UNIT IV

Role of Urban centres in Regional planning; Urban scenario in India; City regions and city problems; Problems of poorly urbanized areas; Strategies for urban planning; Metropolitan planning, preparation of master plans, city region planning.

## FOURTH PAPER

### GEO - 557 [S4 – IV – E1]: West Europe (Elective 'E1')

T1/T2	M. S.	E. S.	Total
20	20	60	100

**T1/T2** = Internal Assessment Tests; **M. S.** = Mid Semester Test; **E. S.** = End Semester Exam

### END SEMESTER EXAMINATION

**Time: 3 hours**

**Maximum Marks: 60**

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit. The purpose of this course is to inculcate self reading and the teachers are required to motivate the students towards that end.

#### UNIT I

Location, Physiographic Regions; Drainage Network; Climatic, Soil and Vegetative – Characteristics and Divisions.

#### UNIT II

Salient Economic Features; Agricultural, Mineral, Energy and Industrial Resources and spatial Pattern.

#### UNIT III

Salient Demographic Features; Demographic Growth, migration & spatial patterns; Ethnic composition and spatial patterns – language, religion and culture; Major Tribes – Distribution and Classification.



## UNIT IV

Geographical study of U. K., France and Germany

### FOURTH PAPER

#### GEO - 558 [S4 – IV – E2]: East Europe (Elective 'E2')

T1/T2	M. S.	E. S.	Total
20	20	60	100

T1/T2 = Internal Assessment Tests; M. S. = Mid Semester Test; E. S. = End Semester Exam

#### END SEMESTER EXAMINATION

Time: 3 hours

Maximum Marks: 60

The question paper will consist of 09 questions. The candidate will be required to attempt 05 questions in all. Question No. 1 will be compulsory and short – note type consisting of four topics one from each unit. The remaining 8 questions will be from the four units – two from each unit. The candidate will be required to attempt one question from each unit. The purpose of this course is to inculcate self reading and the teachers are required to motivate the students towards that end.

## UNIT I

Location, Physiographic Regions; Drainage Network; Climatic, Soil and Vegetative – Characteristics and Divisions.

## UNIT II

Salient Economic Features; Agricultural, Mineral, Energy and Industrial Resources and spatial Pattern.

## UNIT III

Salient Demographic Features; Demographic Growth, migration & spatial patterns; Ethnic composition and spatial patterns – language, religion and culture; Major Tribes – Distribution and Classification.

## UNIT IV

Geographical study of Ukraine, Greece and European Russia

## FIFTH PAPER

### GEO - 534 [S4 – V – L]: Practical (Lab)

Project	Record & V. V.	Desk Work	Total
20	20	60	100

**Record & V. V.** = Internal Assessment Tests; **F. S.** = Mid Semester Test; **L. S.** = Desk Work Exam

### LABORATORY & FIELD WORK EXAMINATION

Time: 3 hours  
Time: 3 hours

Maximum Marks: 60  
Maximum Marks: 20

The Syllabi for Practicals are divided into two sections, Section – A is related to laboratory work, and Section – B is related to Field Work (Surveying).

The practical examination including field work examination under section A and B will be of six hours duration divided into two parts of three hours each. The division of marks in practicals shall be as given below:-

Laboratory Work	M.M. 60
Project	M.M. 20
Record & Viva voce	M.M. 20

The laboratory work is divided into three units. Exercises will be set selecting at least one exercise from each unit. Candidate will have to attempt exercises selecting at least one exercise from each unit.

### SECTION – A: LABORATORY WORK

#### UNIT – I: Cartography:

- 7. Earth and its coordinate System:** Mathematical construction and characteristics of Cylindrical equal area, Equi-Distant, Orthomorphic and Mollewide, Interrupted case of Sinusoidal Projections with continents and Oceans of world.

8. **Analysis of Geological Map.**

**UNIT – II: Spatial Statistical Techniques:**

5. **Hypothesis testing:** Chi-square test, binomial test, t-test, Mann-Whitney U test, Analysis of variance; Multivariate analysis; Gravity potential model; Trend surface analysis – simulation model, diffusion models.

**UNIT – III: Digital Satellite Image & Digital Data Analysis:**

7. **Geographical Information System (GIS):** Definition, components of GIS, forms of spatial data storage- node, arc, polygon; formats of spatial data – raster and vector; attribute data; database management systems – network, hierarchical and relational.
8. **Image Classification Techniques:** Basic principles and elements of principal component analysis;

**SECTION – B: FIELD WORK**

1. **Research Project:** Topic to be assigned by the supervisor.

