PERIYAR UNIVERSITY

PERIYAR PALKALAI NAGAR SALEM - 11



DEGREE OF MASTER OF SCIENCE CHOICE BASED CREDIT SYSTEM (CBCS) SYLLABUS FOR M.SC. GEOGRAPHY FOR THE STUDENTS ADMITTED FROM THE ACADEMIC YEAR 2023–2024 ONWARDS

PERIYAR UNIVERSITY PERIYAR PALKALAI NAGAR SALEM - 11

M.Sc., DEGREE COURSE

(Semester System)

FACULTY OF SCIENCE

BRANCH - IV: GEOGRAPHY (Choice Based Credit System) (For Periyar University Affiliated Colleges)

<u>REGULATIONS AND SYLLABUS</u> (with effect from 2023-2024 onwards)

1. Objectives of the Course:

Geography discipline is penetrating in to all sphere of human activities and therefore it is necessary to prepare the students to cope with the advanced developments in various fields of Geography. The objectives of this course are the following:

- (a) To impart knowledge in conventional and recent concepts and applications in various areas of Geography.
- (b) To train the students in various practical aspect of Geography.

(c) To provide wide choice of elective subjects which are relevant with updated and new areas in various branches of Geography to meet the needs of all students.

2. Eligibility for Admission:

A candidate who has passed B.Sc., Geography / B.Sc., Earth Sciences, Physical Sciences, Chemical Sciences, Biological Sciences and computer applications degree of this University or any of the above degree of any other University accepted by the Syndicate equivalent thereto, subject to such condition as may be prescribed therefore shall be permitted to appear and qualify for the Master of Science (M.Sc.,) Degree Examination in Geography of this University after a course of study of two academic years.

3. Duration of the Course:

The course of study of Master of Science in Geography shall consist of two academic years divided into four semesters with 91 credits. Each Semester consists of 90 working days.

4. Course of Study:

The courses of study for the degree shall be in Branch - Geography (Choice Based Credit System) with internal assessment according to syllabi prescribed from time to time. The **Internal Assessment** mark for theory is distributed to 3 components viz., **Tests, Seminar** and **Attendance** as **10**, **10** and **05** marks, respectively. For practical, it is distributed to **Record Work, Tests,** and **Attendance** as **25**, **10** and **05** marks respectively.

Total Number of Marks For Each Paper	: 2200 : 100 (Int. 25 + Ext. 75)
Project	: 200 [Internal Valuation 75 + External Valuation 75
	Joint Viva Voce 25 + 25]

5. M.Sc. GEOGRAPHY – COURSE STRUCTURE UNDER CBCS (Applicable to the candidates admitted from the academic year 2023-2024)

L C	(Applicable to the calculates admitted from the academic year 2023-2024)						
Semes ter	Course Code	e Code Title of the Course		Credit	Int. Mark	Ext. Mark	Total Mark
	23PGGECT01	Principles of Cartography	7	5	25	75	100
Ι	23PGGECT02	Applied Geomorphology	7	5	25	75	100
	23PGGECP01	Practical - I - Techniques of Map Making	6	4	40	60	100
	23PGGEME01	Population Geography	5	3	25	75	100
	23PGGEME02	Transport Geography	5	3	25	75	100
			30	20			500
	23PGGECT03	Applied Climatology	6	5	25	75	100
	23PGGECT04	Hydrology and Oceanography	5	4	25	75	100
	23PGGECP02	Practical – II – Geo Spatial Lab	5	4	40	60	100
п	23PGGEME03	Urban Geography	4	3	25	75	100
	23PGGEME04	Principles of GIS	4	3	25	75	100
	23PGGES01	NME – I – Geography of India	4	2	25	75	100
		Fundamentals of Human Rights	2	1	25	75	100
			30	22			700
	23PGGECT05	Geographical Thought	6	5	25	75	100
	23PGGECT06	Theoretical and Economic Geography	6	5	25	75	100
	23PGGECT07	Political Geography	6	4	25	75	100
III	23PGGECP03	Practical - III – Techniques of Remote Sensing	6	5	40	60	100
	23PGGEME05	Regional Planning	3	3	25	75	100
	23PGGES02	NME – II – Geography of Tamil Nadu	3	2	25	75	100
		Internship	-	2	-	-	-
			30	26			600
	23PGGECT08	Geography of India and Resource Development	6	5	25	75	100
	23PGGECP04	Practical – IV – Applications of GIS and GPS	6	5	40	60	100
IV	23PGGEME06	Natural Hazards and Disaster Management	4	3	25	75	100
	23PGGEPR1	Project Work	10	7	100	50+50	200
	23PGGES03	SEC/PCS – Remote Sensing and GNSS	4	2	25	75	100
		Extension Activity or Field Work	-	1	-	-	-
			30	23	-	-	500
		Total		91			2300

Credit Distribution:

S.No	Course Details	Credits
1	Core Course [13 Courses]	63
2	Elective Course [6 Courses]	18
3	Skill Enhancement Course (SEC)/Professional Competency Course (PCS)	02
4	Internship	02
5	Extension Activity / Field Work	01
6	NME	04
7	Fundamentals of Human Rights	01
	Total	91

6. Examinations:

The examination shall be of **three hours** duration for each paper at the end of each semester. The candidate failing in any subject(s) will be permitted to appear for each failed subject(s) in the subsequent examination.

Practical examinations for PG course should be conducted at the end of the even semester only.

At the end of fourth semester viva-voce will be conducted on the basis of the Project report by one internal and one external examiner.

7. Question Paper Pattern:

Question Paper Pattern for Theory Examination

Time: Three Hours

Maximum Marks: 75

Part - A (15 X 1 = 15 Marks)

Answer **ALL** Questions

Part - B (2 X 5 = 10 Marks)

Answer ANY TWO Questions out of Five

Part - C (5 X 10 = 50 Marks)

Answer **ALL** Questions

Question Paper Pattern for Practical Examination

Time: 3 Hours Maximum Marks: 100 (Internal: 40 + External: 60)

Practical Examination: **60** Marks (Exam: 50 Marks, Record: 10 Marks) Passing Minimum: **30** Marks (Aggregate of examination and Record) (No passing minimum for records)

There will be one question with or without subsections to be asked for the practical examination. Every question should be chosen from the question bank prepared by the examiner(s). Every fourth student gets a new question i.e. each question may be used for at most three students.

8. Project:

(a) Topic:

The topic of the project shall be assigned to the candidate before the beginning of third semester and a copy of the same should be submitted to the University for approval.

(b) No. of copies project:

The students should prepare **Three** copies of Project report and submit the same for the evaluation by Examiners. After evaluation one copy is to be retained in the college library and one copy is to be submitted to the university (Registrar) and one copy can be held by the student.

Format to be followed:

The formats / certificate for project to be submitted by the students is given below:

Format for the preparation of project work:

- a) Title page
- b) Bonafide Certificate
- c) Acknowledgement
- d) Table of contents
- e) List of Tables
- f) List of Figures

Contents

Chapter No.	Title	Page No.
1.	Introduction	
2.	Review of Literature	
3.	Aim and Objectives	
4.	Methodology	
5.	Results and Discussion	
6.	Summary and Conclusion	
7	References	

Format of the Title page:

TITLE OF THE PROJECT

Project Submitted in partial fulfillment of the requirement for the award of the Degree of Master of Science in

GEOGRAPHY

(Under Choice Base Credit System)

To the Periyar University, Periyar Palkalai Nagar, Salem -636 011

By

Student's Name :

Register Number :

College

:

:

Year

Format of the Certificate:

CERTIFICATE

This is certify that the project entitled tosubmitted in partial fulfillment of the requirement of the award of the Degree of Master of Science in GEOGRAPHY (Under Choice Based Credit System) to the Perivar University, Salem is a record of bonafide research work carried out by.....under my supervision and guidance and that no part of the project has been submitted for the award of any degree, diploma, fellowship or other similar titles or prizes and that the work has not been published in part or full in any scientific or popular journals or magazines

Signature of the Guide

Date:

Place:

Signature of the Head of the Department

Guidelines for approval of PG guides for guiding students in their research for submitting project:

A person seeking for recognition as guide should have:

- (a) A Ph.D. Degree or M.Phil / M.A. / M.Sc. Degree with first class/ second class and
- (b) Should have 3 years of teaching / research experiences.

9. Passing Minimum:

The candidate shall be declared to have passed the examination if the candidate secures not less than 50% marks in both the **University Examinations** and **Internal Assessment** in each paper.

For the Practical paper, a minimum of 50 marks out of 100 marks in the University examination and the record notebook taken together is necessary for a pass. There is no passing minimum for the record notebook. However submission of record notebook is a must.

For the Project work and viva-voce a candidate should secure 50% of the marks for pass. The candidate should attend viva-voce examination to secure a pass in that paper.

Candidate who does not obtain the required minimum marks for a pass in a paper / Practical Project Report shall be required to appear and pass the same at a subsequent appearance.

10. Classification of Successful Candidates:

Candidates who secure not less than 60% of the aggregate marks in the whole examination shall be declared to have passed the examination in **First Class.**

All other successful candidate shall be declared to have passed in the **Second Class**.

Candidates who obtain 75% of the marks in the aggregate shall be deemed to have passed the examination in the **First Class with Distinction** provided they pass all the examinations prescribed for the course at the first appearance.

Candidates who pass all the examinations prescribed for the course in the first instance and within a period of two academic years from the year of admission to the course only are eligible for **University Ranking**.

11. Maximum Duration for the completion of the PG Programme:

The maximum duration for completion of the PG Programme shall not exceed eight semesters.

12. Commencement of this Regulation:

These regulations shall take effect from the academic year 2023-2024, that is, for students who are admitted to the first year of the course during the academic year 2023-2024 and thereafter.

13. Transitory Provision:

Candidates who were admitted to the PG course of study before 2021-2021 shall be permitted to appear for the examinations under those regulations for a period of three years, that is, up to end inclusive of the examination of April / May 2021. Thereafter, they will be permitted to appear for the examination only under the regulations then in force.

Semester – I Core Course - Theory PRINCIPLES OF CARTOGRAPHY Course Code: 23PGGECT01

Course Objectives:

- 1. Exploring and defining Principles of Cartography, Emerging Trends in Cartography and Information Age.
- 2. Understanding the Basics of Geodesy and Map Projections.
- 3. Gaining skills in map Symbols, Cartographic Design, Representation and Production of Maps, and Map Composition.
- 4. Critically assessing Online Resources, Software and its uses for Interactive Mapping.
- 5. Discussing the Importance of Web Mapping and Geospatial Data Policy.

Unit – I: Fundamentals of Cartography

Nature and Scope of Cartography - History and Future of Cartography - Cartography as Language and Communication -Visual Thinking and Visual Communication-Spatial Information System.

Unit - II: Map Projections and Coordinate Systems

Coordinate Systems and Map Projections - Geographical Data – Spatial Objects and Attributes – Map Scale and Accuracy.

Unit – III: Map Design and Layout

Map Compilation - Levels of Data Measurement, Generalization, Cartographic Design Principles - Map Symbolization- Qualitative and Quantitative Symbols - Graphic Communication – Map Elements and Layout.

Unit - IV: Terrain and Surface Analysis

Production and Map output - Typography and Labelling - Thematic Map Forms - Animation – Isarithmic, Choropleth & Surface Mapping-Map Reproduction, Publishing, & Sharing – Cartographic Products.

Unit – V: Online Mapping and Web Services

e-Mapping, Online Map Data Sources - Geospatial Web Services- Dynamic/Interactive Mapping-Cartography and Spatial Information Policy.

Unit – VI: Contemporary Issues

Cartography: Possibilities and Issues in Contemporary Mapping.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Understand the Cartographic Concepts, Recent Trends and the use of	K1, K2
	Information Technology.	
2.	Explain the Fundamental Importance of Map Scale and Benefits and	K2 K3
	limitations of Map Projections.	K2 , K 5
3.	Demonstrate Cartographic Techniques, Generalisation regarding Map	K3 K6
	Design and Layout, Graphical and Visual Variables.	кз, ко
4.	Obtain the skills in Creating reference and Thematic Maps using Hard	K4, K5
	Copies and Web Maps.	
5.	Able to Generate Digital Maps from Open Source Data, Analyse and	K4, K6
	Interpret the Interactive Maps.	
	K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evalua	te; K6 - Create

Text Book(s)

Kraak, M.J. and F.J. Ormeling (1996). Cartography: Visualisation of Spatial data, Longman Ltd., England.

Robinson, A.H., J.L.Morrison, P.C., Muehrcke, A.J.Kimerling and S.C.Guptill (1995). Elements of Cartography, 6th Edition. New York. John Wiley & Sons. USA.

Reference Book(s)

Tyner, J. (1992). Introduction to Thematic Cartography, Prentice-Hall, Englewood Cliff, New Jersey.

Tyner, J.A. (2014) Principles of Map Design. New York, NY: Guilford Press.

Misra, R.P. and A.Ramesh (1989). Fundamentals of Cartography, Concepts PublishingCompany, New Delhi.

Monkhouse, F.J. and Wilkinson, H.R., (1971). Maps and diagrams: their compilation and construction. Methuen.

Brewer, C. A. (2005). Designing Better Maps. Redlands, CA: ESRI Press. (ISBN 1- 58948-089-9).

Dent, B.D., Torguson, J.S. and Hodler, T.W. (2009). Cartography: Thematic Map Design. Boston: McGraw-Hill. 6th edition. (ISBN: 978-0-07-294382-5).

Jennings, Ken. (2011). Map head: Charting the Wide, Weird World of Geography Wonks. New York: Scribner.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.] http://www.fes.uwaterloo.ca/crs/geog165/cart.htm http://www.clorado.adu/geography/geraft/actas/gartecom/gartecom/free.htmlf

http://www.colorado.edu/geography/gcraft/notes/cartocom/cartocom_ftoc.html#3.0 http://www.earthsensing.com/cart/resources/carthelp.html) www.esri.com

Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	1	1	1	1	2
CO2	1	1	3	1	1
CO3	2	1	1	2	2
CO4	1	1	2	1	1
CO5	1	2	1	1	1

Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the 3- Point scale of 1,2, 3 (Strong, Medium and Low)

Semester – I Core Course - Theory APPLIED GEOMORPHOLOGY Course Code: 23PGGECT02

Course Objectives:

- 1. To introduce the concepts in Geomorphology in adequate manner, many facets of surface relief features and to understand various aspects of their growth and evolution on the Earth.
- 2. To understand landscape evolution through time and space
- 3. To understand the processes that shapes the landforms around us.
- 4. To apply geomorphologic concepts to identify and analyze the environmental and resources issues for sustainable development.
- 5. To suggest the tools for reading in the landscape the signs of geomorphologic hazards and risks, human interference and geomorphologic resources.

Unit – I: Scope of Applied Geomorphology

Definition – Nature and Scope of Applied Geomorphology – Fundamental Concepts in Geomorphology – Geosynclines and Mountain Building Process – Hill Slope Evolution - Geomorphic Ideas of Davis, Penck and King.

Unit – II: Energy Flow in Geomorphic System

System Concepts in Geomorphologic Studies – Theories of Continental Drift – Plate Tectonics and Isostacy Seismicity and Volcanism - Climatic and Tectonic Changes and Impacts.

Unit - III: Weathering, Mass Wasting and Development of Hill Slopes

Weathering: Mechanical, Chemical and Biological Weathering - Soil: Soil Formation – Types of Soils – Soil Conservation Practices - Mass Wasting.

Unit – IV: Process Geomorphology

Drainage: Drainage Basin – Basin Morphometry – Fluvial System: Erosion, Sedimentation and Structural Adjustments in the Fluvial System; Waves : Waves Dynamics - Evolution of Shores and Construction and Destruction of Coastal Region; Arid landforms and its Evolution- Karst and Speleology; Glacial process, Erosion and Depositional Landforms.

Unit - V: Applications of Geomorphology

Mapping and Statistical Analysis: Landscape and Land Evaluation - Hazard Analysis – Application of Geo-Informatics in Geomorphological Mapping and Modelling – Geomorphology and its Applications in Agriculture, Water Resources, Hazard, Urban and Mineral Exploration.

Unit – VI: CONTEMPORARY ISSUES

Expert Lectures - Online Seminars – Webinars – Group Discussions Related to Current Issues in Various Landforms and Landscapes.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	A clear understanding of the key concepts of geomorphology and dynamic aspects of landform development	K1, K2		
2.	Understand the relationship between geomorphologic processes, natural resources and environmental impacts.	K2, K5		
3.	Ability to analyze the geomorphologic hazards and risks associated to geomorphic processes	K4, K5		
4.	Learn the various tools and techniques relevant to the applied aspects of Geomorphology in various fields.	K3, K5		
5.	Knowledge on landscape development and skill on the use of geomorphic process, features and event in resources and environmental planning and management	K3, K6		
K1 -	K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			

Text Book(s)

Paul R.Bierman, David R.Montgomery (2020), "Key concepts in Geomorphology", Macmillan Pulblications, New York.

Richard John Huggett (2011), "Fundamentals of Geomorphology", Routledge, Tailor & Francis, London.

Robert, S.A and Suzanne, P.A (2010),"Geomorphology – The mechanics and chemistry of landscapes, Cambridge University Press.

Ramkumar, M (2009),"Geological hazards: Causes, Consequences and methods of Containment", New India Publishers, New Delhi.

Savindra Singh (2019), "Geomorphology" Pravalika Publications, Allahabad, India.

Reference Book(s)

Earth Systems Analysis (ESA) Surface Processes Group (Geohazards), ITC, Enschede, The Netherlands.

Andrew Goudie (2003)," Encyclopedia of Geomorphology", Routledge, Tailor & Francis, New York.

Arthur L. Bloom (2002),"Geomorphology – A Systematic Analysis to Late Cenozoic landforms; Prentice – Hall of India Pvt., Ltd., New Delhi.

Bridge, J.S., (2003),"Rivers and Floodplains: Forms, Processes, and Sedimentary Record", Blackwell Publishing, Oxford.

Grotzinger, J., Jordan, T., Press, F. and Siever, R., (2007), "Understanding Earth (5th ed.)", W.H. Freeman and Co., New York, ISBN 0-7167-6682-5.

Ruhe, R.V. (1982), "Geomorphology", Boston: Honghton Mifflin Company.

William D. Thornbury (1954),"Principles of Geomorphology", John Willy & sons, Inc., London.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	1	1	2	1	1
CO2	2	1	1	2	2
CO3	1	2	1	1	1
CO4	1	1	1	1	2
CO5	1	2	2	1	1
Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the					
3- Point scale of 1,2, 3 (Strong, Medium and Low)					

https://earthsurface.readthedocs.io/en/latest/ surface-processes-and-landscape-evolution-fall-2004/lecture-notes/

Semester – I Core Course – Practical - I TECHNIQUES OF MAPPING Course Code: 23PGGECP01

Course Objectives:

- 1. To introduce the concepts practically in mapping and map analysis
- 2. To understand the various aspects of map reading, interpretation and representation of various data through maps.
- 3. To provide a basic understanding in the field of interpretation and interpolation.
- 4, To understand the theoretical and practical methods pertaining to map making.
- 5. To understand the concepts and importance of various analysis used in mapping.

Unit – I: Map and Interpretation

Map Appreciation and Interpretation: Thematic, Topographic and Atlas Maps - Mapping and Analysis: Relative Relief and Slope Maps; Altimetric and Hypsographic Curves; Stream Analysis.

Unit – II: Climate and Hydrology

Climate and Hydrology: Climograph and Climatograph; Rainfall Variability, Intensity Maps Temperature and Rainfall Profiles; Deviation and Dispersion Graph.

Unit – III: Population and Economic Data Mapping

Population and Economic Data Mapping: Dot Maps, Density Maps - Colour and Grey Scale Patterns.

Unit - IV: Quantitative Symbolization and Location Map

Quantitative Symbolization and Location Maps: Located Representation of Tourism and Facilities; Point and Line Pattern Analysis.

Unit – V: Mapping and Interpolation

Choropleth and Isopleth Maps - Class interval Selection Methods - Interpolation Methods.

Unit - VI: Contemporary Issues and Challenges

Contemporary Issues related to Latest Techniques of Mapping and Map Analysis.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Understanding the importance of various mapping techniques in geographical study	K1, K2	
2.	Understand the procedures and steps involved in the interpretation of thematic, topographic and atlas maps etc.	K2, K3	
3.	Learn the quantitative applications involved in mapping and interpolation.	K3, K6	
4.	Ability to analyze and perform analysis like network analysis, stream analysis, point and line pattern analysis.	K4, K5	
5.	Capable of creating maps based on appropriate cartographic knowledge.	K5, K6	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			

Text Book(s)

Tamaskar, B. G., Deshmukh, V. M. (1974): Geographical Interpretation of Indian Topographical Maps, Orient Longman Ltd., Bombay.

Lawrence, G.R.P. (1971). Cartographic Methods, Methuen & Co., Canada.

Worthington, B.D.R. and Robert Gent (1975): Techniques in Map Analysis, Ebenzer Baylis and Sons, USA.

Singh, R.L., Singh, R.P.B. 2008. Elements of Practical Geography, Kalyani Publishers.

Ramamurthy, K. (1982): Map Interpretation, Rex Printers, Madras.

Understanding Map Projection (2003-2004): GIS by ESRI, Redlands.

Chrisman, N. (1997): Exploring Geographic Information systems, John Wiley & Sons., New York.

The ESRI Guide to GIS Analysis, by Andy Mitchell, ESRI Press, 1999, 188 pp.

Reference Book(s)

Monkhouse, F.J., and Wilkinson, H.R. (1976): Maps and Diagrams, Metheun & Co., London.

Miller, Austin (1953): The skin of the Earth, Methuen & Co. Ltd. London.

Pearson II, F. 1990. Map Projections: Theory and Applications 2nd ed, CRC Press.

Reading, Analysis, Interpretation, 7th ed, Esri Press.

Sarkar, A. 2015. Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
www.sevenoaks.wa.edu.au/linkpage/geog/copy.html
http://www.esri.com/
www.gisdevelopment.net/books/mapping/bmap0010.html

Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	1	1	2	1	1
CO2	1	1	1	1	2
CO3	1	1	1	1	2
CO4	2	1	1	1	1
CO5	1	2	3	1	1
Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the					
3- Point scale of 1,2, 3 (Strong, Medium and Low)					

Semester – I Elective Course - Theory POPULATION GEOGRAPHY Course Code: 23PGGEME01

Course Objectives:

- 1. To explain the Nature and Scope of Population Geography.
- 2. Understanding World Population Growth.
- 3. Know about the Population Composition.
- 4. Study of Population of Population Theories.
- 5. Analyze the Migration and its Causes.

Unit – I: Scope of Population Geography

Nature, Scope and Significance of Population Geography – Sources of Population Data Reliability of Population Data.

Unit – II: World Distribution of Population

World Population Growth - Over Population, Under Population and Optimum Population.

Unit - III: Population Composition and Characteristics

Fertility and Mortality Analysis (Indices and Determinants) - Population Composition and Characteristics (Age, Sex, Rural-Urban, Occupational Structure and Educational Levels).

Unit – IV: Theories of Population Growth

Demographic Transition Theory - Theories of Population Growth: Malthus, Ricardo.

Unit – V: Migration

Migration -- Internal and International -- Cause and Consequences.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Understand Nature of Population Geography.	K1, K2
2.	Assessment of World Population Growth.	K2, K3
3.	Assess the Fertility and Mortality Measures.	K3, K6
4.	Understand the Population Theories.	K4, K5
5.	Explore the Causes of Migration and its Consequences.	K4, K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create		

Text Book(s)

Beaujeu-Garnier, J. (1966). Geography of Population (Translated by Beaver, S.H.) Longmans, London.

Census of India (2001). Series-I India Provisional Population Totals. Published by Registrar General & Census Commissioner, India.

Census of India, (1991). India: A State Profile Published by office of the Registrar General of India, Census Operations, New Delhi.

Chandna, R.C. (2000). Geography of Population: Concepts, Determinants and Patterns, Kalyani Publishers, New Delhi.

Clark J.1 (1965). Population Geography, Permagon Press, New York, 1965.

Reference Book(s)

Mohammad Izhar Hassan (2020). Population Geography: A Systematic Exposition, Routledge, India.

Mohammed I. Hassan (2006). Population Geography. Rawat; New title edition.

Peters: G.L. and Larkim R.P (1979). Population Geography: Problems, Concepts and Prospects Kendele-Hunt Iowa.

Sundram K.V. & Nangia Sudesh, (editors) (1986). Population Geography, Heritage Publishers, Delhi.

Trewartha, G.T. (1969). A Geography of Population: World Patterns, John Wiley & Sons, Inc., New York.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

https://ncert.nic.in/ncerts/l/legy201.pdf https://www.amyglenn.com/geog-regional/geog1303population.htm https://www.bdu.ac.in/cde/slm/slm_sample/msc-geography.pdf https://mu.ac.in/wp-content/uploads/2021/04/t.y.b.a.-paper-7-population-and- economicgeography-e.pdf https://ncert.nic.in/ncerts/l/legy201.pdf

Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	1	1	2	1	2
CO2	1	1	3	1	1
CO3	1	2	1	1	1
CO4	1	1	1	1	1
CO5	1	1	1	2	2
Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the					
3- Point scale of	f 1,2, 3 (Strong, 1	Medium and Lo	ow)		

Semester – I Elective Course – II TRANSPORT GEOGRAPHY Course Code: 23PGGEME02

Course Objectives:

- 1. Understand the purpose and importance of Transportation Geography.
- 2. Explain the spatial organization of transport systems.
- 3. Examine the role of transportation system in energy, environment and economy.
- 4. Discuss the modes of transportation and trade and urban transportation.
- 5. Apply and Evaluate the concepts in planning and policy for sustainable development.

Unit – I: Introduction

Nature, scope and Significance of Transport Geography – Different Types of Transportation and their Merits and Demerits – Choice of Mode of Transport – Intelligent Transport Systems.

Unit – II: Transportation and Cost

Terminal Charges and Operating Charges – Tapering Cost Structure – Variation in Freight Structure on Distance, Commodity, Size and Elasticity of Demand – Long Haul Advantage.

Unit – III: Transportation and Spatial Structure

Transportation network – Nodes and links – Connectivity – Accessibility – Centrality – Structural Analysis of Transportation Network – Graph Theoretic Measures – Stages of Development of Network – Measures of Nodal Accessibility – Matrix Measures – Shortest Path – Desire Line – Detour Index.

Unit – IV: Transportation Theories

Theories of Spatial Interaction – Interaction Models – Gravity Models – Ullman's Triad – Critical Appreciation of Gravity Model – Flows in the Network – Intensity of Flow – Allocation Model for Transportation.

Unit – V: Transportation and planning

Transportation and Spatial Structure – Hinterlands – Regional Specialization – Idealized Process of Transport Development – Rural and Urban Transport Problems – Urban and Regional Transport Planning.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Understand the basics of spatial structure of transportation network	K2, K6			
2.	Analyze the transport systems and problem from a spatial perspective.	K2, K3			
3.	Assess the environment, energy and other socio-economic dimensions with reference to transportation development	K2, K5			
4.	Evaluate different modes of transportation and trade for sustainable developmental activities	K4, K2			
5.	Evaluate the role of transportation in affecting current patterns of economic development and spatial planning	K1, K6			
K1 -	K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create				

Text Book(s)

Black, W. (2003) Transportation: A Geographical Analysis. New York: Guilford.

Haggett, P. (2001) Geography: A Modern Synthesis, 4th Edition, New York: Prentice Hall.

Jean-Paul Rodrigue (20220) The Geography of Transport System, Routledge Taylor & Francis Group, Newyork.

Keeling, D.J. (2007) "Transportation Geography: New Directions on Well-Worn Trails", Progress in Human Geography, 31(2), 217-225.

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Knowles, R., J. Shaw and I. Docherty (eds) (2008) Transport Geographies: Mobilities, Flows and Spaces, Malden, MA: Blackwell.

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Schiller, P.L., and J.R. Kenworthy (2018) An Introduction to Sustainable Transportation: Policy, Planning and Implementation, New York: Routledge.

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https://transportgeography.org/ https://cbpbu.ac.in/userfiles/file/2020/STUDY_MAT/GEO/null.pdf https://unece.org/transport

Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	1	1	1	1	1
CO2	1	3	3	2	1
CO3	2	2	1	2	2
CO4	1	2	1	2	1
CO5	3	1	1	1	2
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Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the 3- Point scale of 1,2, 3 (Strong, Medium and Low)

Semester – II Core Course APPLIED CLIMATOLOGY Course Code: 23PGGECT03

Course Objectives:

- 1. Gaining basic knowledge about weather elements.
- 2. Learning patterns of global wind circulation.
- 3. Understanding world climatic classification, climate change and global warming.
- 4. Acquiring skills in micro level climate, weather forecasting methods and weather measurement techniques.
- 5. Demonstrate applicable solutions for climate change.

Unit - I: Nature and Scope of Applied Climatology

Nature and Scope of Applied Climatology - Development of Applied Climatology Atmosphere: Its Composition (gaseous) and Structure; Insolation and Radiation, Heating of Land and Water; Temperature and Pressure: Variations in Temperature and Pressure; Temperature Zones, Heat Balance, and Pressure Belts.

Unit – II: Global Wind Systems

Global Wind Circulation: Tricellular Meridional Circulation; Trade Winds, Easterlies and Westerlies and Polar Winds; Air Masses: Continental and Maritime; Fronts and Their Types; Clouds; Precipitation: Thunderstorms, Cyclones (Tropical and Temperate) and Anti-Cyclones.

Unit - III: Climate Change and Global Warming

Climatic Classifications; Indian Climates and Climatic Zones; Micro Climates, Agro-Climates and Urban Climates; Urban Air Pollution Problems- Global Climate Change; Global Warming and their likely Impacts on Human Life- El Nino, La Nino.

Unit – IV: Urban Climate

Urban Climate and Global Environment Change - Nature of the Global Environmental Change, Impact of the Urban Climate on GEC.

Unit – V: Weather Forecasting

Weather Forecasting: Short range and Long-Range Forecasting – Weather Satellites and Sensors – Sounding Techniques – Weather Maps – Field Instruments in Forecasts.

Unit – VI: Contemporary Challenges

Contemporary Issues Regarding Climate Change and Solutions: Challenges to Sustainable Development

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	To recall weather elements and its importance	K1, K2	
2.	Discuss various wind around the world	K5, K3	
3.	To compare climatic classification for global and regional level	K3, K4	
4.	Apply various weather forecasting methods	K4, K5	
5.	Analysing the Characteristics of Urban Heat Island	K5, K6	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			

Text Book(s)

Perry, Allen, and Russell Thompson. Applied climatology: principles and practice. Routledge, 2013.

Thompson, R. (1997). Applied climatology: principles and practice. Psychology Press.

Hobbs, John E. Applied climatology: a study of atmospheric resources. Elsevier, 2016.

Rohli, Robert V., and Anthony J. Vega. Climatology. Jones & Bartlett Learning, 2017.

Khan, A., Chatterjee, S., & Wang, Y. (2020). Urban Heat Island Modeling for Tropical Climates. Elsevier.

Hartmann, D. L. (2015). Global physical climatology (Vol. 103). Newnes.

Reference Book(s)

Ahrens, C. D. (2011). Essentials of meteorology: an invitation to the atmosphere. Cengage Learning.

Ahrens, C. D. (2012). Meteorology today: an introduction to weather, climate, and the environment. Cengage Learning.

Collins, M., An, S. I., Cai, W., Ganachaud, A., Guilyardi, E., Jin, F. F., ... & Wittenberg, A. (2010). The impact of global warming on the tropical Pacific Ocean and El Niño. Nature Geoscience, 3(6), 391-397.

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Kelkar, R. R. (2007). Satellite meteorology. BS Publications.

Kidder, S. Q., Kidder, R. M., & Haar, T. H. V. (1995). Satellite meteorology: an introduction. Gulf Professional Publishing.

Lisa F. Schipper and Ian Burton (Ed.) (2008) Adaptation to climate Change, Earthscan Reader Series,

Mather, J. R. (1974): Climatology: Fundamentals and Applications, Mc Graw Hill, New York. Oliver, John E. (1973): Climate and Man's Environment: An Introduction to Applied Climatology, John Wiley & Sons, New York, London.

Thompson, R. D. and Allen, P. (1997): Applied Climatology: Principles and Practice, Routledge, London and New York.

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Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	1	1	2	1	1
CO2	1	1	1	1	2
CO3	3	1	1	1	1
CO4	1	2	2	1	2
CO5	1	1	1	2	1
Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the					
3- Point scale of	f 1,2, 3 (Strong, 1	Medium and Lo	ow)		

Semester – II Core Course HYDROLOGY AND OCEANOGRAPHY Course Code: 23PGGECT03

Course Objectives:

1. To understand the stages of Hydrological cycle

- 2. To introduce a sound scientific knowledge of how water cycles through the Earth's atmosphere, surface and groundwater systems.
- 3. To Understand Significance of oceanography and hydrology in earth and atmospheric science, Configuration of the ocean floor and variation of temperature and salinity of oceans and seas.

Unit – I: Hydrologic Cycle

Hydrological Cycle and its Sub-Cycle; Man's Interference on Hydrological Cycle - Elements of Hydrological Cycle: Precipitation - Intensity and Duration; Evaporation; Infiltration, Surface Runoff, Urban Flooding.

Unit - II: Characteristics and Functions of Fluvial Morphology

Drainage Basin Characteristics: Human Impact on Hydrological System - Morphometric Analysis - Fluvial Process and Analysis.

Unit - III: Aquifers and Groundwater

Ground Water - Occurrence and Types: Movement - Quality and Quantity Measures - Principles of Water Balance and Their Application, - its Relevance in Crop Geography; Water Pollution, Need for Water Management.

Unit - IV: Morphology of Ocean Floor

Relevance of Oceanography in Earth and Atmospheric Sciences: Surface Configuration of the Ocean Floor, Continental Shelf, Continental Slope, Abyssal Plain, Mid-Oceanic and Oceanic Trenches - Relief of Atlantic, Pacific and Indian oceans - Distribution of Temperature and Salinity of Oceans and Seas.

Unit - V: Movement of Ocean Water

Circulation of Oceanic Waters: Waves, Tides and Currents; Currents of the Atlantic, Pacific and Indian Oceans - Marine Deposits and Coral Reefs; Coastal Environment - Oceans as Storehouse of Resources for the Future.

Unit – VI: Contemporary Challenges

Current Challenges and Emerging Issues of Ocean.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Recall hydrological cycle, surface runoff and urban flooding	K1, K2	
2.	Knowledge on fluvial process and morphometry of drainage basin	K2, K5	
3.	Explain groundwater occurrence, types, movement, pollution and need for water management	K3, K5	
4.	Recall ocean waters movements, ocean deposits, coastal environment and coral reefs and discuss the global warming and Sea level rising	K5, K6	
5.	Understand the Movement of Ocean Water.	K3, K5	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			

Text Book(s)

Thurman, H. V. (2019). Essentials of oceanography.

Talley, L. D. (2011). Descriptive physical oceanography: an introduction. Academic press.

Donnet, S., & Canadian Science Advisory Secretariat. (2018). Coast of bays metrics: Geography, hydrology and physical oceanography of an aquaculture area of the South Coast of Newfoundland. Canadian Science Advisory Secretariat (CSAS).

Cracknell, A. P. (1981). Remote sensing in meteorology, oceanography and hydrology.

Park, S. K., & Xu, L. (Eds.). (2013). Data Assimilation for Atmospheric, Oceanic and Hydrologic Applications (Vol. II) (Vol. 2). Springer Science & Business Media.

Diaz, H. F. (2000). El Niño and the Southern Oscillation: multiscale variability and global and regional impacts. Cambridge University Press.

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Manheim, F. T. (1966). Soviet Books and Publications on Geological and Chemical Oceanography, Hydrology, and Other Subjects Acquired During the Second International Oceanographic Congress, Moscow, June 1966: Titles and Some Translated Contents and Notes. Woods Hole Oceanographic Institution.

Addison, H. (1961). Land Water and Flood, Chapman and Hall, London.

Anikouchine, W.A. and Sternberg, R.W. (1973). The World Oceans - An Introduction to Oceanography, Englewood Cliffs, N.J.

Chorley, R.J. (ed) (1969). Introduction to Physical Hydrology, Methuen, London.

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Grald, S. (1980). General Oceanography - An Introduction, John Wiley & Sons, New York.

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Thurman, H.B. (1984). Introductory Oceanography, Charles Webber E. Merril Publishing Co.

Todd, D.K. (1959). Ground Water Hydrology, John Wiley, New York.

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https://online-learning.tudelft.nl/courses/introduction-to-water-and-climate/ https://www.mooc-list.com/tags/hydrology https://www.usgs.gov/special-topic/water-science-school/science/what-hydrology https://www.nationalgeographic.org/encyclopedia/hydrology/ https://www.sciencedirect.com/topics/earth-and-planetary-sciences/hydrology

Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	1	1	1	1	2
CO2	1	2	1	1	1
CO3	1	1	2	1	1
CO4	1	1	1	1	1
CO5	1	1	3	2	2
Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the 3- Point scale of 1 2 3 (Strong Medium and Low)					

Semester – II Core Course Practical - II GEOSPATIAL LAB Course Code: 23PGGECP02

Course Objectives:

- 1. To introduce the concepts of Geographic Information Systems practically and to understand the various aspects of map reading, design and evaluation of digital maps.
- 2. To understand the theoretical and practical concepts pertaining to map making.
- 3. To obtain a comprehensive understanding of the spatial models, applications and tools currently available in the field of GIS.
- 4. To apply the GIS concepts to create, analyse and interpret the spatial maps in the field of geospatial technology.
- 5. To suggest tools and techniques for execution of spatial operations.

Unit – I: Fundamentals of Mapping

Georeferencing – Map Projection and Transformation – Spatial Entity Creation – Digitization – Symbolization - Attribute Data Editing – Labelling and Annotation – Map Design and Layout.

Unit – II: Spatial Data Editing

Attribute Data Management and Thematic Mapping: Quantitative and Qualitative Mapping,

Unit – III: Spatial Data Analysis

Dot Map, Located Pie Chart and Bar Chart - Proximity Analysis - Overlay Analysis.

Unit – IV: Terrain and Surface Analysis

Surface Analysis and Interpolation Techniques: Creation of Contours, Slope, Aspect, Kriging, Spline, Inverse Distance Weighted (IDW) – 3D Visualization: DEM, TIN Analysis.

Unit - V: Spatial applications and Modelling

Multi Criteria Analysis and Ground Truth Support: GPS with Field Data Attributes - Geotagged Photographs.

Unit – VI: Contemporary Issues

Local field Observations - Group Discussions related to Current Issues and Challenges in Geographic Information System (GIS) Applications.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	A clear understanding in key concepts of cartography, GIS and the aspects in reading, designing, and evaluating digital cartographic maps	K1, K2	
2.	Understand the relationship between map projections, coordinate systems and geospatial layers including map algebra and spatial statistics.	K2, K3	
3.	Learn the skills in data collection, storage, analysis and interpretation of spatial data in GIS interface.	K3, K6	
4.	Ability to analyse and evaluate the maps and perform spatial operations like overlay analysis, landscape analysis, terrain analysis, suitability analysis and spatial modelling.	K4, K5	
5.	Create tools and models for developing and solving complex geospatial problems in GIS	K4, K6	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			

Text Book(s)

Aronoff, S. (1991). Geographic Information Systems: A Management Perspective, WDL Publications, Ottawa, Canada.

Bernhardsen, T. (2002). Geographic information systems: an introduction. John Wiley & Sons.

Chrisman, N. (1997). Exploring Geographic Information systems, New York: John Wiley & Sons., Inc.

Ian Heywood, Sarah Cornelius and Steve Carver (2000). An Introduction to Geographical Information Systems, Addison Wesley Longman Limited, New York.

Kang-tsung Chang (2002). Introduction to Geographical Information Systems, Tata McGraw-Hill Publishing Company Limited, New Delhi.

Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2005). Geographic information systems and science. John Wiley & Sons.

Reference Book(s)

Ballas, D., Clarke, G., Franklin, R. S., & Newing, A. (2017). GIS and the social sciences: Theory and applications. Routledge.

Zhu, X. (2016). GIS for environmental applications: a practical approach. Routledge.

Whyatt, D., Clark, G., & Davies, G. (2011). Teaching geographical information systems in geography degrees: A critical reassessment of vocationalism. Journal of Geography in Higher Education, 35(2), 233-244

Argles, T. (2017). Teaching practical science online using GIS: a cautionary tale of coping strategies. Journal of GeoGraphy in higher education, 41(3), 341-352.

Gould, M. (2018). Tailoring GIS courses for employment. In GIS (pp. 189-195). CRC Press

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Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	2	1	1	2	1
CO2	1	2	1	1	1
CO3	1	1	1	1	2
CO4	2	1	1	1	1
CO5	1	1	3	1	1
Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the					
3- Point scale of 1,2, 3 (Strong, Medium and Low)					

Semester – II Elective URBAN GEOGRAPHY Course Code: 23PGGEME03

Course Objectives:

- 1. Understand the Nature and Scope of Urban Geography.
- 2. Know about the Demographic aspects of Urban Centres.
- 3. Analyze the Models of Morphology.
- 4. Know about the Dynamics of Urban Expansion.
- 5. Understand the Urban Hierarchy and Urban Planning.

Unit - I: Nature and Scope of Urban Geography

Nature, Scope and Development of Urban Geography – Urbanization – Urbanism – World Urbanization – World Urbanization Curve – Urbanization in India.

Unit – II: Urban Demography

Demographic Structure of Cities – Models – Occupational Structure – Urban Land Use and its Types – Central Business District – Delimitation of Central Business District.

Unit - III: Urban Morphology and Functional Classification of Towns

Urban Land Use Models – Burgess – Hoyt – Harris and Ullman – Urban Ecology – Social Area Analysis – Factorial Ecology – Basic and Non Basic Activity of Urban Centre – Functional Classification of the Town and Cities.

Unit - IV: Urban Expansion and City Region

Urban Expansion – Vertical – Urban Sprawl – Urban Renewal – Urban Fringe – Suburbs – City Region and Umland Demarcation.

Unit – V: Hierarchy of Urban Centres and Planning

Rank Size Rule – Central Place Theory – Urban Problems: Housing, Slums, Transport, Solid Waste Management, Drinking Water Supply and Pollution – Urban Planning – Smart Cities in India.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Understand the Importance of Urban Geography.	K1, K2	
2.	Able to analyze the Demographic Structure of Cities.	K2, K5	
3.	Know about the Urban Morphology	K3, K4	
4.	Understand the Urban Expansion and its Characteristics.	K5, K6	
5.	Critically analyze the Hierarchy of Urban Centres and need Urban Planning.	K4, K6	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			

Text Book(s)

Carter, H. (2002). The Study of Urban Geography. Arnold Heinemann, London.

Fyfe, N.R. and Kenny, J.T. (2005): The Urban Geography Reader, Routledge, London. Johnson, J.H. (1972). Urban Geography: An Introductory Analysis. Pergamon Press, Oxford.

Mayer, H.M. and Kohn, C.F. (1967). Readings in Urban Geography. Central Book Depot, Allahabad.

Hall, T. (2006): Urban Geography, Routledge, London.

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Pacione M. (2009). Urban Geography: A Global Perspective, Taylor and Francis, New York.

Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	2	1	1	1	2
CO2	1	2	1	1	1
CO3	2	3	1	1	1
CO4	1	1	2	2	3
CO5	1	2	1	1	1
Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the					
3- Point scale of 1.2. 3 (Strong, Medium and Low)					

Semester – II PRINCIPLES OF GIS Elective Course Code: 23PGGEME04

Course Objectives:

- 1. Understanding the Basic Spatial Concepts, Approaches, History and Development of GIS.
- 2. Obtain an Understanding of Spatial and Non-spatial Data Models.
- 3. Understanding of data Capturing Methods and Data Accuracy and Accessing Publicly availAble Data sets.
- 4. Teaching Basic Spatial Operations Skills Necessary to work with GIS Project.
- 5. Develop a Project Requiring GIS as a Management, Analytical, and/or Visualization Tool Using Spatial Analysis Methods.

Unit - I: Basic Concepts of Spatial Science and GIS

Basic Concepts of Spatial Science and GIS: Geographic Spaces, Spatial Data and Information, Reference Systems and Datums, GIS Definition, Approaches and Components; History and Development of GIS.

Unit - II: Data Models and Management

Data Models and Management: Spatial Data Models – Vector and Raster Data Models; Data Models – Object Based – Oriented Data Models – Coding and Encoding.

Unit - III: Data Capture and Geoprocessing

Data Capture and Geoprocessing: Sources of Geographic Data, Capturing Methods, Topology, Geometric transformation, Reprojection, Scales in GIS, Precision and Accuracy of Geographical Data.

Unit – IV: GIS: Spatial Operations

Spatial Operations: Basic Operations and Set Theory Basics - Buffer, Overlay, Network, View Shed and Watershed Analysis, Interpolation, 3D Visualization.

Unit - V: Spatial Modeling and its Applications

GIS Modeling - Multi-Criteria Analysis - Network Applications – Location Based Services - Geocoding - Suitability Modeling - Location Allocation Modeling - Applications.

Unit – VI: Contemporary Issues and Challenges

Contemporary issues in GIS

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Developing an understanding of spatial concepts and spatial and non-spatial data models	K1, K2	
2.	Learning skills in creating spatial data models using GIS software	K2, K6	
3.	Gaining ability to access data in the GIS, compile, analyse, and present geospatial data	K3, K4	
4.	Performing GIS functions and demonstrate the skills in modelling	K4, K5	
5.	Developing the ability to analyze and solve spatial problems using modelling approaches	K3, K6	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			

Text Book(s)

Aronoff, S. (1991). Geographic Information Systems: A Management Perspective, WDL Publications, Ottawa, Canada.

Ian Heywood, Sarah Cornelius and Steve Carver (2000). An Introduction to Geographical Information Systems, Addison Wesley Longman Limited, New York.

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Dr. K. Elangovan (2006). GIS - Fundamentals, Applications and Implementations, New India Publishing Agency, New Delhi.

Kang-tsung Chang (2002). Introduction to Geographical Information Systems, Tata McGraw-Hill Publishing Company Limited, New Delhi.

Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	1	2	1	2	2
CO2	1	1	1	1	2
CO3	1	1	1	1	1
CO4	1	1	2	1	1
CO5	2	1	3	1	1

Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the 3- Point scale of 1,2, 3 (Strong, Medium and Low)

Semester – II NME GEOGRAPHY OF INDIA Course Code: 23PGGES01

Course Objectives:

- 1. To learn the Physiography and Climate of India.
- 2. To Understand Soil Characteristics and Agriculture Distribution.
- 3. To know Population Characteristics and Distribution.
- 4. To get knowledge of Transport Systems of India.
- 5. To study Mineral Resource and Industries.

Unit – I: Physiography and Climate

Location and Extent - Major Physiographic Regions - Drainage System (Himalayan and Peninsular), Climate: Seasonal Weather Characteristics, Indian Monsoon (Mechanism and Characteristics)

Unit – II: Soil and Agriculture

Soil: Types and Distribution – Agriculture: Rice, Wheat, Cotton, Jute, Tea, Coffee, Sugarcane and Tobacco.

Unit – III: Population Characteristics

Population: Growth and Distribution of Population – Migration and Urbanization in India.

Unit – IV: Transport

Transport and Communication: Road, Railways and Water Transport – Inland Waterways – Ports – Air Transport.

Unit – V: Mineral Resource and Industries

Mineral resources: Iron ore, Manganese, Bauxite and Mica only – FUEL Minerals: Coal and Petroleum – Major Industries: Iron and Steel, Cotton Textile, Cement, Sugar and Jute industries.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Understand the Physical and Climate aspects of India.	K1, K2		
2.	To analysis Soil types and Agricultural Practices.	K2, K3		
3.	Acquaint with the distinctiveness of Population Characteristics.	K3, K6		
4.	To evaluate Various Transport Network system in India	K4, K5		
5.	To know about the Mineral Resources and Industries in India.	K4, K6		
K	K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			

Text Book(s)

Deshpande, C.D. (1992). India – A Regional Interpretation. , New Delhi, ICSSR and Northern Book Centre

Nag, P., & Sengupta, S. (1992). Geography of India. Concept Publishing Company.

R.L. Singh (1989) India: A Regional Geography. Delhi: UBSPD,

Sen Gupta, P. and Sdaysuk, Galina. (1968). Economic Regionalisation of India – Problems Approaches, Monograph No.8, New Delhi: Census Commissioner, Govt. of India

Spate, O.H.K (1967) India and Pakistan, (3rd edition) London: Methuen

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Reference Book(s)

Oldham, R. D. (1894). The evolution of Indian Geography. The Geographical Journal, 3(3), 169-192.

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Kapur, A. (2004). Geography in India: A languishing social science. Economic and Political Weekly, 4187-4195.

Singh, S. (2007). Indian Geography. Murari Lal & Sons.

Sutton, I. (1991). Preface to Indian country: geography and law. American Indian Culture and Research Journal, 15(2), 3-36.

Jennings, Ken. (2011). Map head: Charting the Wide, Weird World of Geography Wonks. New York: Scribner

MacEachren, Alan, M., (1995). How Maps Work, Representation, Visualization and Design, Guilford Press

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Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	1	1	2	1	2
CO2	1	1	3	1	1
CO3	1	2	1	1	1
CO4	1	1	1	1	1
CO5	1	1	1	2	2
Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the 3- Point scale of 1 , 2 , 3 (Strong, Medium and Low)					

Semester – III Core Course GEOGRAPHIC THOUGHT Course Code: 23PGGET05

Course Objectives:

- 1. Understand the Contribution to Geography.
- 2. Know about the Traditions and Explanations of Geography.
- 3. Understand the Dualism in Geography.
- 4. Should be able to learn Quantitative Revolution in Geography, Paradigm Shift and Various New Ideas and Concept in Geography
- 5. Explain the Status of Indian Geography.

Unit – I: Ancient Scholar's Contribution in the Field of Geography

Nature of Geography - Greeks, Romans, Arabs, German, French, British, American and Indian Geographical Thought.

Unit – II: Traditions and Explanations in Geography

Traditions in Geography – Man – Land, Area Studies, Spatial and Earth Science Traditions – Explanations in Geography: David Harvey.

Unit – III: Dualism in Geography

Dualism and Dichotomy – Systematic and Regional, Deterministic and Possibilistic, Physical and Human, Ideographic and Nomothetic, Qualitative and Quantitative.

Unit - IV: Models and Quantitative Revolution in Geography

Unit - V: Status of Modern Geography

Conceptual and Methodological Developments and Changing Paradigms; Status of Indian Geography and Future of Geography;

Unit – VI: Contemporary Geography

Geography in the Face of Modern World Challenges

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Recall Ancient Scholars' Contribution to Geography	K1, K2	
2.	Evaluate the Traditions and Explanations in Geography	K2, K5	
3.	Assessment of Dualism Concept in Geography	K4, K5	
4.	Analyze the Quantitative Revolution in Geography	K3, K5	
5.	Discuss Various Status of Geography in India.	K3, K6	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			

Text Book(s)

Rana, Lalita. Geographical thought. Concept Publishing Company, 2008.

Martin, G. J. (2005). All possible worlds: A history of geographical ideas. OUP Catalogue.

Nayak, A., & Jeffrey, A. (2013). Geographical thought: An introduction to ideas in human geography. Routledge.

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Beazley C.R., 1949. The Dawn of Modern Geography Vol.III, New York.

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Majid Husain, 2015. Evolution of Geographical Thought, 6th edition - Rawat Publications, New Delhi.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.] https://www.tandfonline.com/doi/full/10.1080/2325548X.2014.901849

Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	1	1	2	1	2
CO2	1	1	3	1	1
CO3	1	2	1	1	1
CO4	1	1	1	1	1
CO5	1	1	1	2	2
Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the					
3- Point scale of	3- Point scale of 1,2, 3 (Strong, Medium and Low)				

Semester – III Core Course THEORETICAL ECONOMIC GEOGRAPHY Course Code: 23PGGECT06

Course Objectives:

- 1. Provide students with the contextual information of economic activities
- 2. Understand the Agricultural Activities and its types.
- 3. Know about the Distribution and Significance of Minerals.
- 4. Understand and Analyze the Major Industries.
- 5. Understand the Role of Transport and Trade Blocs in Economic Activities.

Unit I: Introduction to Geography of Economic Activities

Nature, scope and Significance - Approaches - Dynamism of Economic Activities.

Unit II:World Agriculture

Factors Affecting Agriculture – Distribution, Production and Trade of Wheat, Rice, Maize, Sugarcane, Cotton, Tea and Rubber – Forestry – Fishing – Grazing and Pastoralism.

Unit III: Economic Significance of Minerals

Distribution and Production of Iron Ore, Manganese, Bauxite, Copper, Gold and Mica – Fuel Resources: Coal – Petroleum and Nuclear Minerals.

Unit IV: Manufacturing Industries

Major inputs – Locational factors – Distribution of Iron and Steel, Textiles (Cotton and Woollen) – Ship-Building and Automobile Industries – Major Industrial Regions of the World.

Unit V: Transportation

Land, Water and Air – Major Sea Routes of the World – Trade – Factors Influencing Trade – Technological Revolution and Trade – Major Trade Blocs of the World – EU – OPEC – ASEAN – WTO.

Unit – VI: Contemporary Issues

Contemporary issues and challenges

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Understand the Nature and Scope of Economic Geography.	K1, K2		
2.	Develop an Idea about World Agriculture.	K2, K3		
3.	Develop the Ability to Analyze Distribution of Minerals and its Types.	K3, K4		
4.	Know about the Importance of Industries in Economic Activities.	K4, K6		
5.	Develop an Understanding the Role of Transport in Economic Geography.	K4, K5		
K	K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			

Text Book(s)

Boyce, R.R. (1974). "The Basis of Economic Geography", Holf Rinehart and Winston Inc. New York

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Abler, Adam and P.Gould (1972). Spatial Organisation: A Geographer's View of the World. Englewood Cliff. New Jersey.

Baldwin, R., R. Forslid, P. Martin, G. Ottaviano and F. Robert-Nicoud, (2003). Economic Geography and Public Policy, Princeton.

Fujita, M., P.R. Krugman and A.J. Venables, (1999). The Spatial Economy, MIT Press.

Smith, D.E. (1971) Industrial Location: An Economic Geographical Analysis, John Wiley and Sons., New York.

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http://www2.clarku.edu/econgeography/

https://transportgeography.org/

https://unstats.un.org/unsd/trade/globalforum/publications/tva/World%20Bank%20-%20Changing%20the%20Industrial%20Geography%20in%20Asia.pdf

Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	1	1	2	1	2
CO2	1	1	3	1	1
CO3	1	2	1	1	1
CO4	1	1	1	1	1
CO5	1	1	1	2	2

Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the 3- Point scale of 1,2, 3 (Strong, Medium and Low)

Semester – III Core Course POLITICAL GEOGRAPHY Course Code: 23PGGECT07

Course Objectives:

- 1. Understanding the Nature and Scope of Political Geography.
- 2. Understand the Concept of Nation and State.
- 3. Acquire knowledge in Frontiers and Boundaries.
- 4. Know about the Theories in Political Geography.
- 5. Explore the Political Geography in India.

Unit – I: Nature of Political Geography

Political Geography - Nature and Scope – Contemporary Traditions in Political Geography – Approaches to Study – Its Relation to other Social Science Disciplines.

Unit – II: Concept of Nation and State

Nation - Concept – Characteristics – Elements of Nation Building – Nationalism; State: Concept – Characteristics – Types; Land Locked – Littoral – Island States.

Unit – III: Frontiers and Boundaries

Frontiers and Boundaries: Evolution and Classification – Core Areas and Capitals, Centre – Periphery Relations.

Unit – IV: Theories in Political Geography

Global Strategic Views; Heartland and Rim Land Theories – Indian Ocean Politics – International Relations – Multinational Organizations: Political, Economic and Cultural Blocks.

Unit - V: Political Geography in India

Political Geography of India: Federalism - State Reorganization after Independence – Emergence of New States – India's Border Problems – Inter State Disputes with Tamil Nadu.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Developing an idea about the Nature and Scope of Political Geography.	K1, K2	
2.	Able to understand the Concept of Nation and State.	K3, K4	
3.	Understand the Frontiers and Boundaries.	K2, K3	
4.	Ability to analyze critically the Theories in Political Geography.	K4, K5	
5.	Ability to describe the Political Geography of India.	K4, K6	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			

Text Book(s)

Dikshit, R.D., 1999. Political geography: A Century of progress, Sage, New Delhi.

John R., 1982. Short: An introduction to Political Geography Routledge, London,

Panikkar K. M., 1959. Geographical Factors in Indian History: 2 vols. Asia Publishing House, Bombay.

Pounds N.J.G., 1972. Political Geography. McGraw Hill, New York.

Joe Painter and Alex Jeffery.2009 Political Geography, 2nd Ed. Sage in 2009 with a reprint in 2012 (ISBN 978-1-4129-0138-3).

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Alexander, L.M., 1963. World Political Patterns Ran McNally, Chicago,

De Blij, H. J., Glassner, 1968. Martin Systematic Political Geography, John Wiley, New York.

Deshpande C.D., 1992. India-A Regional Interpretation Northern Book Centre, New Delhi.

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Fisher Charles A., 1968. Essays in Political Geography, Methuen, London

Sukhwal, B.L., 1968. Modern Political Geography of India Sterling Publishers, New Delhi.

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https://www.opengeography.org/ch-10-political-geography.html https://www.ou.edu/faculty/T/Gary.L.Thompson/links.html https://www.journals.elsevier.com/political-geography

Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	1	1	2	1	2
CO2	1	1	3	1	1
CO3	1	2	1	1	1
CO4	1	1	1	1	1
CO5	1	1	1	2	2
Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the					
3- Point scale of 1.2. 3 (Strong, Medium and Low)					

Semester – III Core Course Practical –III TECHNIQUES OF REMOTE SENSING Course Code: 23PGGECP03

Course Objectives:

- 1. To train students on Aerial Photo data type and formats.
- 2. To give insights on Interpretation of Aerial Photographs.
- 3. To give an introduction to Satellite Images.
- 4. To make students Interpretation of Satellite Image.
- 5. To develop Image Processing and Classification.

Unit – I: Aerial Photographs

Marginal Information - Determination of Scale - Determination of Height.

Unit – II: Interpretation of Aerial Photographs Physical Features - Cultural Features.

Unit – III: Satellite Images

Marginal Information - Elements of Image Interpretation.

Unit – IV: Interpretation of Satellite Image Interpretation Physical Features - Cultural Features

Unit - V: Image Processing and Classification

Digital Image Processing - Image Classification

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Get knowledge in Aerial Photo and its Formats.	K2, K1	
2.	Get an idea about the Aerial Photo Interpretation.	K2, K4	
3.	Develop an idea about the Satellite Images.	K3, K5	
4.	Critically Interpret the Satellite Image Interpretation.	K3, K6	
5.	Manipulate the Image Processing and Classification.	K5, K6	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			

Text Book(s)

Congalton R.G and K. Green (2009)," Assessing the Accuracy of Remotely Sensed Data: Principles and Practices", Second Edition, Boca Raton, CRC

Floyd F.Sabins (2020),"Remote Sensing: Principles of Interpretation and applications", 4th Edition, Waveland Press, Inc., Long Grove, Illinois, USA.

John A. Richards (2013)," Remote Sensing Digital Image Analysis – An Introduction", (Fifth Edition). Springer-Verlag Berlin

John R.Jensen (2017),"Introductory Digital Image Processing : A Remote Sensing Perspective", 4th Edition, Pearson Series in Geographic Information Science

Robert, A. Schowengergt (1983)," Techniques for Image Processing and classification in Remote Sensing", Office of Arid Lands Studies, University of Arizona, Tucson, Arizona

Lilesand and Keifer (2000). Introduction to Remote sensing and Image Interpretation; John Willy & sons Ltd., New York.

Reference Book(s)

Robert, G. Reeves (1983),"Manual of Remote Sensing Vol. I and II", American Society of Photogrammetry, Falls, Church, USA.

Richards (1993),"Remote sensing digital Image Analysis - An Introduction", Springer - Verlag.

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Mapping with Programme Outcomes (MPO)*					
MPO	PSO 5				
CO1	1	1	2	1	2
CO2	1	1	3	1	1
CO3	1	2	1	2	1
CO4	1	1	1	1	1
CO5	1	1	1	2	2

Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the 3- Point scale of 1,2, 3 (Strong, Medium and Low)

Semester – III Elective REGIONAL PLANNING Course Code: 23PGGEME06

Course Objectives:

- 1. To Understand the Meaning of Region and Types of Region.
- 2. Know about the Approaches to the Regional Planning.
- 3. Focus on the Principles and Process of Regional Planning
- 4. Discuss the Problems and Types of Planning.
- 5. Application of Geospatial Technology in Regional Planning.

Unit – I: Region and Regionalization

Concept of Region - Meaning and Types of Regions – Formal Region and Functional Region - Regionalization – Regional Imbalance and Disparity.

Unit – II: Approaches to Regional Planning

Approaches to Regional Analysis - Geographic Approach – Economic Approach – Holistic Approach.

Unit – III: Planning Principles and Process

Regional Planning - Meaning and Need for Regional Planning – Planning Principles – Regional Planning Process.

Unit - IV: Types of Planning and Problems of Regional Planning

Types and Levels of Planning - Rural and Urban Planning - Sectoral and Spatial planning - Problems of Regional Planning.

Unit – V: Regional Planning in India

Regional Planning in India - Development of Backward Areas and Drought Prone Regions – Planning for Hill Area Development and Tribal Development– Geospatial Technology and Regional Planning

Unit – VI: Contemporary Issues

Contemporary Issues

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Acquire a General Understanding of the Regional Development and Planning.	K1, K2		
2.	Understand the Approaches to Regional Planning.	K4, K5		
3.	Evaluate Regional Planning Processes.	K4, K5		
4.	Acquire ability to Formulate the Strategies for Regional Planning.	K3, K6		
5.	Know about the Regional Planning in India and Applications of Geospatial Technology in Regional Planning.	K1, K6		
K	K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			

Text Book(s)

Abler, R., Hall, Englewood Cliffs, N.J., (1971). Spatial Organisation: The Geographer's View of the World.

Bhat, L.S., (1973). Regional Planning in India, Statistical Publishing Society, Calcutta.

Friedmann, J. Alonso, W., (1967). Regional Development and Planning - A Reader, M.I.T. Press, Cambridge, Mass.

Glikson (1955). Arthur: Regional Planning and Development, Netherlands Universities foundation for International Co-operation, London.

Kuklinski, A.R., (ed.) (1972). Growth Poles and Growth Centres in Regional Planning Mouton, The Hague.

Mishra, R.P., (1980). Multi-Level Planning Heritage Publishers, Delhi.

Reference Book(s)

Misra, R.P. (1969). Regional Planning: Concepts, Techniques and Policies, University of Mysore, Mysore.

Misra, R.P. (1974). Regional Development Planning in India-A Strategy, Institute of Development Studies, Mysore.

Mitra, A., (1965). Levels of Regional Development, Census of India, Vol.I, Part IA(I) and (ii), New Delhi.

Myrdal, G., (1957). Economic Theory and Under-Development Regions, Gerald Duckworth, London.

Janki Jiwan (2021). Regional Development And Planning. Rawat Publication.

Vishwambhar Nath (2009).Regional Development and Planning in India. Concept Publishing Company.

Allen G. Noble, Frank J. Costa, Robert B. Kent (1998). Regional Development and Planning for the 21st Century, Routledge.

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Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	1	1	1	1	1
CO2	1	3	3	2	1
CO3	2	2	1	2	2
CO4	1	2	1	2	1
CO5	3	1	1	1	2
Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the					
3- Point scale of	f 1,2, 3 (Strong, 1	Medium and Lo	w)		

Semester – III NME GEOGRAPHY OF TAMIL NADU Course Code: 23PGGES02

Course Objectives:

- 1. To learn the Physiography and Climate of Tamil Nadu.
- 2. To Understand the Agriculture and Irrigation Systems.
- 3. To study Mineral Resource and Industries.
- 4. To get knowledge of Transport Systems of Tamil Nadu
- 5. To know Population Characteristics and Distribution.

Unit – I: Physiography and Climate

Location and Administrative Units – Physiographic Divisions – Climate – Rainfall – Soils – Natural Vegetation.

Unit – II: Agriculture and Irrigation

Agriculture – Major Crops – Rice, Cotton, Tea, Coffee and Sugarcane – Irrigation and Types.

Unit – III: Resources and Industries

Power Resources: Hydel, thermal and nuclear – Mineral resources – Iron ore, manganese and bauxite – Fuel minerals – Coal and Petroleum – Major industries – Iron and steel, Cotton textile, Cement and Sugar industries.

Unit – IV: Transport

Transport and Communication - Road, Railways - Ports - Air Transport.

Unit – V: Population Characteristics

Growth and Distribution of Population – Population migration, Urbanisation in Tamil Nadu.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Understand the Physical and Climate aspects of Tamil Nadu.	K1, K2	
2.	Analyze the Agricultural Practices.	K2, K3	
3.	To know about the Mineral Resources and Industries in Tamil Nadu.	K3, K6	
4.	To evaluate Various Transport Network system in Tamil Nadu.	K4, K5	
5.	Acquaint with the distinctiveness of Population Characteristics.	K4, K6	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			

Text Book(s)

Spate, O.H.K. and Learmonth, A.T.A. (1967). India and Pakistan: A General and Regional Geography. Methuen Publications, London.

Stamp, L.D. (1967). Asia: A Regional and Economic Geography. B.I. Publication Ltd., New Delhi.

Shafi, M. (2000). Geography of South Asia. MacMillan and Co., Kolkata.

SHBoTN (2004). Statistical Hand Book of Tamil Nadu. Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

TNEA (2014). Tamil Nadu – An Economic Appraisal 2011-12 to 2013-14. Department of Evaluation and Applied Research, Chennai.

SCRoTN (2004). Season and Crop Report of Tamil Nadu for the Agricultural Year 2003-2004. Department of Economics and Statistics, Chennai.

Mapping with Programme Outcomes (MPO)*						
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO1	1	1	2	1	2	
CO2	1	1	3	1	1	
CO3	1	2	1	1	1	
CO4	1	1	1	1	1	
CO5	1	1	1	2	2	
Map Course O	Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the					

3- Point scale of **1,2, 3 (Strong, Medium and Low**)

Semester – III INTERNSHIP Course Code:

Course Objectives:

- 1. Integrate theory and practice.
- 2. Discover new knowledge and understanding through exploration and investigation during an internship.
- 3. Develop communication, interpersonal and other critical skills in the job interview process.
- 4. Use of Geospatial technology and latest techniques in the relevant discipline of study.
- 5. An opportunity to develop a right work attitude, self-confidence, interpersonal skills and ability to work as a team in a real organisational setting.

INTERNSHIP PROCEDURE

Each candidate has to spend at least 8-10 weeks in an institution / industry /educational Institution/ business house where mapping or GIS or remote sensing, GPS or a combination of these above is the main activity, which may also include marketing of such products. At the end of the internship, the candidate has to produce an experience certificate and a report.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Develop skills to work effectively and further develop observation, recording and interpretation skills	K2, K1		
2.	Helps in skill building – Improvise skills in specific field of interest	K2, K4		
3.	Communicate and collaborate effectively and appropriately with different professionals in the work environment through written and oral means	K3, K5		
4.	Use geospatial tools and techniques for hazard mitigation and resource planning.	K3, K6		
5.	Pursue research and develop capabilities to handle multi-disciplinary field projects and work in teams and demonstrate leadership skills with professional ethics.	K5, K6		
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create				

Text Book(s)

H. Frederick Sweitzer and Mary A. King (2019). Successful Internship - 5th edition. Brooks/Cole Publishing Co.

Lynne S. Gross (1993). Internship Experience - 2nd edition. Waveland Press, Inc.

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https://careers.uiowa.edu/students/benefits-internship

https://scholarworks.bgsu.edu/cgi/viewcontent.cgi?article=1000&context=oer

https://www.grinnell.edu/sites/default/files/documents/Student%20Internship%20Han dbook%20-%202014.pdf

https://careers.uiowa.edu/students/benefits-internship

Semester – IV Core Course GEOGRAPHY OF INDIA Course Code: 23PGGECT08

Course Objectives:

- 1. To learn the Physiography and Climate of India.
- 2. To Understand Soil Characteristics and Agriculture Distribution.
- 3. To study Mineral Resource and Industries.
- 4. To get knowledge of Transport Systems of India.
- 5. To know Population Characteristics and Distribution.

Unit - I: Physical and Climate Settings of India

Location and Extent - Major Physiographic Regions - Drainage System (Himalayan and Peninsular), Climate: Seasonal Weather Characteristics, Climatic Divisions, Indian Monsoon (Mechanism and Characteristics).

Unit – II: Soil and Agriculture

Soil: Types and Distribution – Agriculture: Major Crops – Rice, Wheat, Cotton, Jute, Tea, Coffee, Sugarcane and Tobacco - Major Crop Regions.

Unit – III: Resources and Industries

Power resources: Hydel, Thermal and Nuclear – Mineral Resources: Iron ore, Manganese, Bauxite and Mica – Fuel Minerals: Coal and Petroleum – Major Industries: Iron and Steel, Cotton Textile, Cement, Sugar and Jute Industries.

Unit – IV: Transport

Transport and communication: Land transport: Road and Railways – Water Transport – Inland waterways – Ports – Air transport.

Unit – V: Population Characteristics

Population: Growth and Distribution of Population - Migration - Urbanization in India.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Understand the Physical and Climate aspects of India.	K1, K2	
2.	To analysis Soil types and Agricultural Practices.	K2, K3	
3.	To know about the Mineral Resources and Industries in India.	K3, K6	
4.	To evaluate Various Transport Network system in India	K4, K5	
5.	Acquaint with the distinctiveness of Population Characteristics.	K4, K6	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			

Text Book(s)

Deshpande, C.D. (1992). India – A Regional Interpretation. , New Delhi, ICSSR and Northern Book Centre

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Kapur, Anu. Indian Geography: A Future with a Difference. Allied Publishers, 1998.

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Raza, M., & Aggarwal, Y. (1986). Transport geography of India: commodity flows and the regional structure of the Indian economy. Concept Publishing Company.

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MacEachren, Alan, M., (1995). How Maps Work, Representation, Visualization and Design, Guilford Press

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https://www.india.gov.in/india-glance/profile https://www.jstor.org/stable/1773463 https://www.nature.com/articles/001413a0 https://asiasociety.org/education/india-geographic-sketch https://www.insightsonindia.com/indian-geography//

Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	1	1	2	1	2
CO2	1	1	3	1	1
CO3	1	2	1	1	1
CO4	1	1	1	1	1
CO5	1	1	1	2	2
Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the					
3- Point scale of 1,2, 3 (Strong, Medium and Low)					

Semester – IV Core Course APPLICATIONS OF GIS AND GPS Course Code: 23PGGECP04

Course Objectives:

- 1. Introduce the Concepts Practically in Geographic Information System.
- 2. Understanding of Basic Skills Necessary to work with GIS environment.
- 3. Understand the Theoretical and Practical Concepts pertaining to GPS
- 4. Assess the importance of the Map Design and Layout.
- 5. Know about the GNSS.

Unit – I: Geographic Information System

Map to Raster Conversion - Georeferencing - Digitization - Point, Line and Polygon.

Unit - II: Data Coding and GIS Analysis

Data Coding - DEM and TIN Generation - GIS Analysis: Query, Buffering and Overlay.

Unit – III: Global Positioning System

Global Positioning Survey - GPS Survey (Point, Line & Polygon)

Unit – IV: Map Design and Layout

Thematic Map Preparation

Unit – V: Global Navigation Satellite Systems GNSS Survey (Point, Line & Polygon) - Thematic Map Preparation

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	A clear understanding in key concepts of GIS.	K1, K2		
2.	Hands on Experience in Data Coding and GIS Analysis.	K2, K3		
3.	Understand the Importance of GPS.	K3, K6		
4.	Learn the skills in Thematic Map Preparation.	K4, K5		
5.	Ability to use the GNSS in Geography.	K4, K6		
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create				

Text Book(s)

Aronoff, S. (1991). Geographic Information Systems: A Management Perspective, WDL Publications, Ottawa, Canada.

Chang, Kang-Tsung (2006). Introduction to geographic information systems. Boston: McGraw-Hill Higher Education.

Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2005). Geographic information systems and science. John Wiley & Sons.

Bernhardsen, T. (2002). Geographic information systems: an introduction. John Wiley & Sons.

Ian Heywood, Sarah Cornelius and Steve Carver (2010). An introduction to geographical information systems. Prentice Hall - Pearson Education limited.

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Chrisman, N. (1997) : Exploring Geographic Information systems, John Wiley & Sons., New York

The ESRI Guide to GIS Analysis, by Andy Mitchell, ESRI Press, 1999, 188 pp.

Reference Book(s)

Ballas, D., Clarke, G., Franklin, R. S., & Newing, A. (2017). GIS and the social sciences: Theory and applications. Routledge.

Zhu, X. (2016). GIS for environmental applications: a practical approach. Routledge.

Whyatt, D., Clark, G., & Davies, G. (2011). Teaching geographical information systems in geography degrees: A critical reassessment of vocationalism. Journal of Geography in Higher Education, 35(2), 233-244.

Argles, T. (2017). Teaching practical science online using GIS: a cautionary tale of coping strategies. Journal of GeoGraphy in higher education, 41(3), 341-352.

Gould, M. (2018). Tailoring GIS courses for employment. In GIS (pp. 189-195). CRC Press.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

www.ncgia.ucsb.edu/education/curricula/giscc http://www.esri.com/ https://www.le.ac.uk/ar/arcgis https://www.researchgate.net/publication/301561923_Introduction_to_GIS_A_practical_based_La b_work_for_beginners http://edshare.soton.ac.uk/19460/ http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.466.1262&rep=rep1&type=pdf

Mapping with Programme Outcomes (MPO)*					
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	1	1	2	1	2
CO2	1	1	3	1	1
CO3	1	2	1	1	1
CO4	1	1	1	1	1
CO5	1	1	1	2	2
Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the					

Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the 3- Point scale of 1,2, 3 (Strong, Medium and Low)

Semester – IV Elective Course NATURAL HAZARDS AND DISASTER MANAGEMENT Course Code: 23PGGEME07

Course Objectives:

- 1. To orient students about various natural and manmade disasters
- 2. To teach the concept of Disaster management and measures to be taken at different stages of disaster management
- 3. To provide insight about global, national and regional level scenario of disaster management
- 4. To train students in doing Risk assessment and Vulnerability analysis
- 5. To teach students vulnerability reduction strategies

Unit – I: Introduction

Hazard, Risk, Vulnerability, Disaster; Disaster Management, Meaning, Nature Importance, Dimensions & Scope of Disaster Management, Disaster Management Cycle. National disaster Management Framework; Financial Arrangements for Disaster Management, International Strategy for Disaster Reduction.

Unit – II: Natural Disasters

Natural Disasters- Meaning and Nature of Natural Disasters: Types and Effects, Hydrological Disasters: Flood, Flash flood, Drought, Cloudburst - Geological Disasters: Earthquakes, Landslides, Avalanches, Volcanic eruptions, Mudflow – Meteorological Disasters: Cyclone, Storm, Storm surge, Tidal waves, Heat and cold Waves, Climatic Change, Global warming, Sea Level rise, Ozone Depletion.

Unit – III: Man-Made Disaster

CBRN – Chemical Disasters, Biological Disasters, Radiological Disasters, Nuclear Disasters. Fire: Building Fire, Coal Fire, Forest Fire, Oil Fire. Accidents: Road Accidents, Rail Accidents, Air Accidents, Sea Accidents - Pollution and Deforestation: Air Pollution, Soil and Water Pollution, Industrial Wastewater Pollution, Deforestation.

Unit – IV: Disaster Determinants

Factors Affecting Damage – Types, Scale Population, Social Status, Habitation Pattern, Physiology and Climate - Factors Affecting Mitigation Measures, Prediction, Preparation, Communication, Area and Accessibility.

Unit – V: Disaster Management Information Sources Forecasting & warning:

Indian Meteorological Department, Tsunami Warning Centre, Pacific Disaster Centre, Central Water Commission; Resources: UNISDR, USAID, Red Cross, Indian Disaster Resource Network; Other: National Disaster Management Authority, National Institute of Disaster Management, National Geophysical Research Institute, Bhuwan, National Disaster Response Force, State and District Disaster Management Centre.

Unit – VI: Strategic Development for Vulnerability Reduction

Physical & Social Infrastructure for Vulnerability Reduction, Interactive Areas for Vulnerability Reduction & Policymaking, Hazard Resistant Designs and Construction, System Management Strategic Planning for Vulnerability Reduction.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Students will learn different disasters and measures to reduce the risk due to these disasters.	K1, K2
2.	Students will learn institutional frame work for disaster management at national as well as global level	K2, K3
3.	The student will get familiarized with the ecosystem and issues related to the environmental system.	K3, K6
4.	Students can act as First Respondent and can handle Onsite situations will help students in building a safer environment through sustainable development.	K4, K5
5.	At the end of this course, students are expected to carry out pre and post- disaster damage assessments, understand disaster recovery and the role of different agencies in the rehabilitation	K4, K6
		THE O

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Text Book(s)

Disaster Administration and Management, Text & Case studies- SL Goel-Deep and Deep Publications .

Disaster Management- G.K Ghosh-A.P.H. Publishing Corporation .

Disaster management – S.K.Singh, S.C. Kundu, Shobha Singh A – 119, William Publications, New Delhi.

Disaster Management - Vinod K Sharma- IIPA, New Delhi,1995

Encyclopedia of Disaster Management- Goel S.L. - Deep and Deep Publications, New Delhi, 2006.

Reference Book(s)

Disaster Administration and Management, Text & Case studies- SL Goel-Deep and Deep Publications

Disaster Management- G.K Ghosh-A.P.H. Publishing Corporation

Disaster management – S.K.Singh, S.C. Kundu, Shobha Singh A – 119, William Publications, New Delhi.

Disaster Mitigation and Management Post - Tsunami Perspectives P, Jagadish Gandhi

Disaster Mitigation - Experiences and reflections - By Pradeep sahni - Prentice - Hall of India

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

www.ncgia.ucsb.edu/education/curricula/giscc http://www.esri.com/ https://www.le.ac.uk/ar/arcgis https://www.researchgate.net/publication/301561923_Introduction_to_GIS_A_practical_based_La b_work_for_beginners

http://edshare.soton.ac.uk/19460/

http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.466.1262&rep=rep1&type=pdf

Mapping with Programme Outcomes (MPO)*					
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CO3	1	2	1	1	1
CO4	1	1	1	1	1
CO5	1	1	1	2	2
Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the					
3- Point scale of 1,2, 3 (Strong, Medium and Low)					

Semester – IV Course Course PROJECT WORK Course Code: 23PGGEPR1

Course Objectives:

- 1. Think beyond the classroom, practical work and help them to comprehend the skills, knowledge and confidence in the specific subject area
- 2. Exercise students' understanding and skills acquired in MSc programme by applying them to a practical problem
- 3. Understanding of current work in the field and ability to plan a research project
- 4. Understanding and ability to carry out an investigative science project
- 5. Developing skills in scientific writing for publication in referred journals

The Project Work is an extended piece of work carried out (largely) independently. A faculty member will be assigned as advisor for each student based on expert knowledge in the subject area. In addition to Guide, Departmental Committee also interact with students through presentations and other means of discussion for creating professional experience in the specific field. Guidelines and other details for the Project Work/ Dissertation will be provided by the department.

Students are encouraged to carry out projects in collaboration with industry, or in support of research projects in the Department of Geography / Government departments / National Research Institutes/UN agencies / NGO's. etc.

The project can be taken highlighting any issue relating to geographic knowledge and analysis. The project is for addressing problems relating to spatial data gathering, mining, warehousing and or raster / vector analysis and modelling. Programming or script writing can also be theme for the project, if it involves spatial data handling or analysis or modelling or in combinations of all. All data analysis and survey related projects shall necessarily present in a series of thematic maps. At the end of the project work, students have to present a seminar.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Gaining ability to capture, analyze and present geospatial data for visualisation	K2, K4		
2.	Demonstration of depth of technical understanding and application skills	K3, K5		
3.	Demonstration of ability to critically analyse other work and come up with original ideas with creative contribution	K1, K4		
4.	Ability to analyze the results and draw conclusions from the research work	K4, K5		
5.	Ability to write academic/ scientific report for a specific topic to solve the spatial problems	K5, K6		
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create				

Text Book(s)

Douglas Amedeo, Reginald G.Golledge (1975). An Introduction to Scientific Reasoning in Geography; John Wiley & sons Inc. New York.

H.N.Misra, and Vijai P.Singh (1998). Research Methodology Social, Spatial and Policy Dimensions; Rawat Publications, New Delhi.

William Strunk(2005) The Elements of Style: A Style Guide for Writers, ISBN 0-97522-980-X, http://academic.csuohio.edu/simond/courses/elos3.pdf

Reference Book(s)

Council of Science Editors. Scientific Style and Format: The CSE Manual for Authors, Editors, and Publishers. 7th ed. Reston, VA: Council of Science

Humbert M. Blacock, J.R,Ann B. Blalock (1971). Methodology in Social Research; Mc GRAW HILL – London.

Kothari C.R (2004). 'Research Methodology Methods and Techniques', New Delhi: New Age International Publication.

Kumar Ranjit (2011). 'Research Methodology a step by step guide for beginners', New Delhi: SAGE Publication India Limited.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

APA Citation Guide - University Libraries - The Ohio State University http://www.lib.ohio-state.edu/sites/guides/apagd.html Examples of citations using the Publication Manual of the American Psychological Association (APA). APA Style.org Frequently Asked Questions: http://www.apastyle.org/faqs.html Chicago Manual of Style Examples of Chicago-Style Documentation http://www.chicagomanualofstyle.org/tools.html Examples of citations using the Chicago Manual of Style. Chicago Manual of Style Citation Guide - University Libraries - The Ohio State University: http://library.osu.edu/sites/guides/chicagogd.php

Mapping with Programme Outcomes (MPO)*					
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CO1	1	3	2	1	2
CO2	1	1	1	1	1
CO3	2	2	1	2	
CO4	1	1	2	1	1
CO5	1	1	1	2	2
Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the 3- Point scale of 1.2, 3 (Strong, Medium and Low)					

Semester – IV Skill Enhancement Course REMOTE SENSING AND GNSS Course Code: 23PGGES03

Course Objectives:

- 1. Understand the purpose and importance of RS, GIS & GNSS.
- 2. To provide background knowledge and understanding of principles of RS and GNSS Systems.
- 3. To enhance student's capacity to interpret images and extract information on the earth surface from multi-resolution imagery at multi-scale level.

Unit - I: Introduction to Remote Sensing

Remote Sensing Process - Analog to Digital data – Digital Image Data Formats - Image Processing System Characteristics - Initial Statistical Extraction: Histograms, Univariate and Multivariate Statistics – Scientific visualization – Image Pre-Processing: Calculating Radiance from DNs - Atmospheric, Radiometric and Geometric Correction.

Unit – II: Aerial & Satellite Remote Sensing

Aerial Remote Sensing: Aerial photographs: Classifications based on Camera, Film and Orientation –Photo scale - Parallax – Stereo model - Flight planning – Marginal information – Interpretation keys - LIDAR – Drone Satellite Remote Sensing: Satellite – Types, Orbits and Sensors – Resolution: types - aspects of LANDSAT, SPOT, IRS, IKONOS, QUIKBIRD and recent satellites – Marginal information and Interpretation – Applications of Microwave and Thermal Remote Sensing.

Unit – III: Image Enhancement

Contrast Enhancement: Linear, Non-linear and Level slicing – Spatial Feature Enhancement: Spatial Filtering, Edge enhancement and Fourier and Wavelet transform – Multi-image enhancement – Band ratioing, Principal Component Analysis, Vegetation Indices, IHS and Texture Transformations and Image fusion.

Unit – IV: Image Classification

Supervised Classification: Classification Algorithm and Training Site Selection - Unsupervised Classification – Hybrid Classification – Classification of Mixed Pixels: Spectral Mixture Analysis and Fuzzy Classification – Post Classification Smoothing – Ancillary Data - Classification Accuracy Assessment - Artificial Neural Networks – Contextual Classification – Object-Oriented Classification.

Unit – V: Basics of GNSS

Introducing Global Navigation Satellite System: GNSS Components, Satellite Orbit, Satellite Position on Orbital Plane, Signals, Reference System and Observation Techniques.

Unit - VI: Remote Sensing, Image Processing and Applications in Geography

Pre-processing: Rectification and Enhancements – Manipulation - Classification methods: Supervised and Unsupervised - Ground truth verification – Accuracy assessment -Vegetation Indices: VI and NDVI, Software: ERDA and ENVIS. Applications of Remote Sensing in Geography: Geomorphology, Water Resources, Disaster studies, Forestry, Agriculture, Land use and Land Cover and Urban planning.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1.	Understand the basics of spatial structure of transportation network	K2, K6			
2.	Gain insights on processing methods and techniques for handling radiometric and geometric properties of remotely sensed	K4, K5			
3.	Developing data processing automation skills necessary to analyze high level remote sensing and GIS Products.	K3, K6			
4.	Familiarize with principles and methods of multi-resolutions and multi- spectral data fusion, multi- temporal processing and accuracy assessment.	K1, K6			
5.	Know about the Image Processing and it's in Geography.	K3, K6			
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create					

Text Book(s)

Peter A. Burrough and Rachael A. McDonnell, 2011, Principles of Geographic Information Systems, Oxford University Press.

Ian Heywood, Sarah Cornelius and Steve Carver, An Introduction to Geographic Information System, 2010, third edition, Pearson Education Ltd.

David O' Sullivan and David J. Unwin, 2010, Geographic Information analysis, second edition, John Wiley & Sons.

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Stephen R. Galati, 2006, Geographic Information Systems Demystified, ARTECH HOUSE, INC., ISBN-13: 978-1-58053-533-5.

Michael N. DeMers, 2009, GIS For Dummies, Wiley Publishing, Inc., ISBN: 978-0-470-23682-6

Bhatta, Basudeb. Remote Sensing and GIS. India, OUP India, 2011.

Campbell, James B. Introduction to Remote Sensing. United Kingdom, Taylor & Francis,

2002. Joseph, George. Fundamentals of Remote Sensing. India, Universities Press, 2005.

Digital Image Processing. India, Tata McGraw Hill Education, 2009.

Jain, Anil K. Fundamentals of digital image processing. India, Prentice Hall, 1989.

Mapping with Programme Outcomes (MPO)*							
MPO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5		
CO1	1	1	2	1	2		
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Map Course Outcomes (CO) for each Course with Programme Specific Outcomes (PSO) in the							
3- Point scale of 1,2, 3 (Strong, Medium and Low)							

Model Question Paper

M.Sc. DEGREE EXAMINATION, NOVEMBER 2020. Third Semester Geography GEOGRAPHICAL THOUGHT

Time : Three hours

Maximum: 75 marks

PART A — $(15 \times 1 = 15 \text{ marks})$ Answer ALL Questions.

1. Who is the "Father of Geography"?

(a) Eratosthenes (b) Anaximander (c) Ptolemy (d) Aristotle

- 2. Environment presents a range of opportunities and man is free to choose between them. This basic premise in geography is known as
- (a) Determinism (b) Neo-determinism (c) Possibilism (d) Probabilism
- 3. Who was the first promoter of geographical knowledge from Germany?
- (a) Ferdinand Von Richthofen (b) Carl Ritter (c) Carl Andree (d) Oscar Peschel
- 4. Who among the following geographers laid down the foundation of dichotomy of general versus Special Geography?
- (a) Immanuel Kant (b) Bernhard Varene (c) Peter Apin (d) Sebastian Munster
- 5. There are _____ traditions in Geography.
- (a) 3 (b) 4 (c) 5 (d) 6
- 6. The concept of Paradigm was propounded by
- (a) Thomas Kuhn (b) E. Soja (c) P. Hall (d) Lewis Mumford
- 7. Who of the following can be considered as an Opponent of Quantitative Revolution?
- (a) Stamp (b) Chorley (c) Haggett (d) Hagerstrand
- 8. Who among the following Geographers Emphasized the Predominant role of Climate in humaN life?
- (a) Geddes (b) Jefferson (c) Huntington (d) Brunhes
- 9. Who amongest the following, defined Geography as a Chorological Science? (a) Ptolemy (b) Richthofen (c) Hettner (d) P.E. James
- 10. The Base Level Concept was Postulated by
- (a) James Hutton (b) J.W. Powell (c) W.M. Davis (d) Walther Penck

11. Risk is a reflection of ______ on the Earth.(a) Disasters (b) Rotation (c) Eclipes (d) Spherical shape

- 12. EIA expand
- (a) Environmental Impact Analysis (b) Ecological Impact Assessment
- (c) Environmental Impact Assessment (d) Ecological Impact Analysis.
- 13. Remote Sensing, GIS and GPS together termed as ———— Technology.
- (a) Global (b) Earth (c) Geographical (d) Spatial
- 14. GIS is a ——— tool.
- (a) Software (b) Hardware (c) Electrical (d) Electronic
- 15. GPS expand
- (a) Global Pointing System (b) Geographical Pointing System
- (c) Global Positioning System (d) Geographical Positioning System

PART B — $(2 \times 5 = 10 \text{ marks})$ Answer any TWO Questions.

- 16. Write a short note on Indian Geographical Thought.
- 17. Explain the Qualitative and Quantitative Dualism in Geography
- 18. Describe the various Explanations in Geography.
- 19. Give a brief account on Resource Management in Geography.
- 20. Discuss the uses and Applications of GPS.

PART C — $(5 \times 10 = 50 \text{ marks})$ Answer ALL Questions.

- 21. (a) Explain the Greeks contribution to Geographical Thought. Or
 - (b) Give an account on British School of Thought.
- 22. (a) Write an essay on the Four Traditions in Geography. Or(b) Discuss the dualism in Physical and Human Geography.
- 23. (a) Give a detailed note on Models in Geography.
 Or
 (b) Explain the various Theories in Geography.
 - (b) Explain the various Theories in Geography.
- 24. (a) Write an essay on Environmental Impact Assessment. Or

(b) Write a detailed note on Human Rights and Conflict Resolution.

25. (a) Discuss the uses and applications of Remote Sensing in Geography. Or(b) Explain the various uses and advantages of GIS in Geography.