



University of Gour Banga

Draft Syllabus for

**FOUR-YEAR UNDERGRADUATE
(HONOURS/ HONOURS WITH RESEARCH)**

COURSE IN

GEOGRAPHY (MAJOR)

Session: 2024-2025

UNDER NEP-2020

Semester (I+II+III+IV)

**University of Gour Banga
P.O. – Mokdumpur
District – Malda
West Bengal
PIN - 732103**

Descriptive Type Question Pattern

**For Discipline Specific Course/ Major Core (DC-MJ) in Geography
(GEODC-MJ)**

Total Marks: 75 (Each Course)

Theory (Semester End Written Examination)

Full Marks = 30

(6 Marks × 4 Questions) + (1 Mark (MCQ) × 6 Questions)
Question(s) containing 6 marks will be divided into two parts

Internal Assessment

Full Marks = 25

(Tentative Mode: Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 5 marks)

Practical (Semester End Laboratory Based Test)

Full Marks = 20

(07 Marks × 1 Question) + (05 Marks × 1 Question) + (04 Marks × 1 Question) + (04 Marks for Laboratory Notebook (2) & Viva-voce (2))

Word limits for descriptive type questions (Theory)

10 marks: 600 – 700 Words

5 marks: 301 – 350 Words

Duration of Examination

Theory paper of 30 marks: 2 hours

Practical paper of 20 marks: 2 hours

SEMESTER WISE COURSE STRUCTURE

for 4-Year Undergraduate Programme under NEP (2020)-2024

Semester	Discipline Specific Course/ Major Core (DC-MJ)	Disciplinary Minor Course (IDC/DC-MN)	Multidisciplinary Course (MDC)	Ability Enhancement Course (AEC)	Skill Enhancement Course (SEC)	Value Added Course (VAC)	Internship / Apprenticeship/Project/Community Engagement	Total Credits
I	DC-MJ-101 (4)	IDC/DC-MN-101 (4)	MDC-101 (3)	AEC-1 (2)	SEC-1 (3)	VAC-1 (2)	IAPC-1 (2)	20
II	DC-MJ-201 (4)	IDC/DC-MN-201 (4)	MDC-201 (3)	AEC-2 (2)	SEC-2 (3)	VAC-2 (2)	IAPC-2 (2)	20
III	DC-MJ-301 (4) DC-MJ-302 (4)	IDC/DC-MN-301 (4)	MDC-301 (3)	AEC-3 (2)	SEC-3 (3)		IAPC-3 (2)	22
IV	DC-MJ-401 (4) DC-MJ-402 (4) DC-MJ-403 (4)	IDC/DC-MN-401 (4)		AEC-4 (2)		VAC-3 (2)		20
V	DC-MJ-501 (4) DC-MJ-502 (4) DC-MJ-503 (4) DC-MJ-504 (4)	IDC/DC-MN-501 (4)						20
VI	DC-MJ-601 (4) DC-MJ-602 (4) DC-MJ-603 (4) DC-MJ-604 (4)	IDC/DC-MN-601 (4)						20
VII	DC-MJ-701 (4) DC-MJ-702 (4) DC-MJ-703 (4) DC-MJ-704 (4)	IDC/DC-MN-701 (4)						20
VIII	DC-MJ-801 (4)	IDC/DC-MN-801 (4)					Research Project/Dissertation (12)	20
Total								162

**Semester-Wise Course Structure Under NEP (2020)- 2024
For B.A./B.Sc. (Honours/ Honours with Research) in Geography**

Semester-wise Distribution of Credits/ Marks

SEMESTER-I				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Discipline Specific Course/ Major Core (DC-MJ)	GEO-DC-MJ-101A: Geotectonics (03)	GEO-DC-MJ-101B: Geotectonic (01)	04	75
Disciplinary Minor Course (IDC/DC-MN)	IDC/DC-MN-101 (04)		04	
Multidisciplinary Course (MDC)	MDC-101 (03)		03	
Ability Enhancement Compulsory (AEC)	AEC-1 (02)		02	
Skill Enhancement Course (SEC)	SEC-1 (03)		03	
Value Added Course (VAC)	VAC-1 (02)		02	
Internship / Apprenticeship/Project/ Community Engagement	IAPC-1 (02)		02	
Total			20	

SEMESTER-II				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Discipline Specific Course/ Major Core (DC-MJ)	GEO-DC-MJ-201A: Geomorphology (03)	GEO-DC-MJ-201B: Geomorphology (01)	04	75
Disciplinary Minor Course (IDC/DC-MN)	IDC/DC-MN-201 (04)		04	
Multidisciplinary Course (MDC)	MDC-201 (03)		03	
Ability Enhancement Compulsory (AEC)	AEC-2 (02)		02	
Skill Enhancement Course (SEC)	SEC-2 (03)		03	
Value Added Course (VAC)	VAC-2 (02)		02	
Internship / Apprenticeship/Project/ Community Engagement	IAPC-2 (02)		02	
Total			20	

SEMESTER-III				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Discipline Specific Course/ Major Core (DC-MJ)	GEO-DC-MJ-301A: Climatology (03)	GEO-DC-MJ-301B: Climatology (01)	04	75
	GEO-DC-MJ-302A: Human Geography (03)	GEO-DC-MJ-302B: Human Geography (01)	04	75
Disciplinary Minor Course (IDC/DC-MN)	IDC/DC-MN-301 (4)		04	
Multidisciplinary Course (MDC)	MDC-301 (3)		03	
Ability Enhancement Compulsory (AEC)	AEC-3 (02)		02	
Skill Enhancement Course (SEC)	SEC-3 (03)		03	
Internship / Apprenticeship/Project/ Community Engagement	IAPC-3 (02)		02	
Total			22	

SEMESTER-IV				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Discipline Specific Course/ Major Core (DC-MJ)	GEO-DC-MJ-401A: Geography of India (03)	GEO-DC-MJ-401B: Geography of India (01)	04	75
	GEO-DC-MJ-402A: Population Geography (03)	GEO-DC-MJ-402B: Population Geography (01)	04	75
	GEO-DC-MJ-403A: Soil & Biogeography (03)	GEO-DC-MJ-403B: Soil & Biogeography (01)	04	75
Disciplinary Minor Course (IDC/DC-MN)	IDC/DC-MN-401 (04)		04	
Ability Enhancement Compulsory (AEC)	AEC-4 (02)		02	
Value Added Course (VAC)	VAC-3 (02)		02	
Total			20	

Curriculum of Discipline Specific Course / Major Core)

SEMESTER-I				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Discipline Specific Course/ Major Core (DC-MJ)	GEO-DC-MJ-101A: Geotectonics (03)	GEO-DC-MJ-101B: Geotectonics (01)	04	75
Disciplinary Minor Course (IDC/DC-MN)	IDC/DC-MN-101 (04)		04	
Multidisciplinary Course (MDC)	MDC-101 (03)		03	
Ability Enhancement Compulsory (AEC)	AEC-1 (02)		02	
Skill Enhancement Course (SEC)	SEC-1 (03)		03	
Value Added Course (VAC)	VAC-1 (02)		02	
Internship / Apprenticeship/Project/ Community Engagement (IAPC)	IAPC-1 (02)		02	
Total			20	

Curriculum of Discipline Specific Course/ Major Core (DC-MJ) -101 for UG Program

Paper Name: GEOTECTONICS

Title of the Course:	GEOTECTONICS (THEORY)
Discipline Specific Minor Paper Code:	GEO-DC-MJ-101A (Theory)
Semester = I (THEORY)	
Credit = 03	
Objectives of the Course:	<ul style="list-style-type: none"> i) To inculcate fundamental knowledge of the different aspects of Geotectonic. ii) To enrich the student's knowledge about the interiors of the Earth, which is not visual. iii) To understand the magnetism of the Earth, and its dynamics. iv) Developing the concept of Earth's broken and moving crust, in the name of Plate Tectonic. v) To clarify the idea about earthquake and volcanoes, with their internal mechanism and world-wide distribution.
Learning Outcomes of the Course	<ul style="list-style-type: none"> i) Learners will gain a comprehensive understanding of the fundamental principles and concepts of Geotectonic and they will understand the earth's tectonic and structural evolution.

	<ul style="list-style-type: none"> ii) Gain knowledge about earth's interior. Develop an idea about concept of plate tectonics, and resultant landforms. iii) Acquire knowledge about types of folds and faults and earthquakes, volcanoes and associated landforms. iv) Identification of rocks and minerals.
<u>Course Content</u>	
Module: -1: Origin of the universe, solar system and Earth's evolution	<ul style="list-style-type: none"> i) Tidal hypothesis ii) Big Bang theory iii) Tectonic and structural evolution of the earth with special reference to the geological time scale
Module: -2: Earth's Interior, Minerals and Rocks	<ul style="list-style-type: none"> i) Understanding earth's interior with the help of seismological evidences ii) Concept of Mineral and rocks: types, formation and characteristics
Module: -3: Dynamic Earth	<ul style="list-style-type: none"> i) Isostasy: Theory of Airy and Pratt; Isostatic adjustments, and distribution of gravity anomalies. ii) Continental drifting (Alfred Wegener), and seafloor spreading iii) Plate tectonics; concept of neo-tectonics; iv) Mountain building theories: Kober and A. Holmes
Module: -4: Endogenetic process and landforms	<ul style="list-style-type: none"> i) Earthquake: causes and consequences ii) Volcanoes: causes, types and consequences iii) Folding and faulting: concept, components, types and resulting landforms.
Suggestive Readings:	<ol style="list-style-type: none"> 1. Basu, A. & Kar, N.S. (2022): Geotectonics & Geomorphology: (Theory & Lab), Global Net Publications, Delhi. 2. Belousov V. V. (1980): Geotectonics, Springer-Verlag Berlin and Heidelberg GmbH & Co. KG, New York. 3. Das, C & Pramanik, T. (2021): Bhugathan O Bhumirup (Geotectonics And Geomorphology), Enova Publications, Kolkata 4. Garg, S. (2017): Geotectonics and Geomorphology, Random Publications, Delhi. 5. Maiti, R. (2023): Geotectonics and Geomorphology, an insight into process- form relationship, Nabodaya publications, Kolkata. 6. Maity, A.K. & Manna, S. (2021): Approches to geotectonics and geomorphology, Dev Prakashani, Kolkata. 7. Sil, A. (2021): Geotectonics & Geomorphology, Himalayan Books, Kolkata. 8. Singh, S. (2020): Physical Geography, Pravalika Publications, Allahabad 9. Summerfield, M.A. (2018): Geomorphology & Global Tectonics, John Wiley, New York 10. Thori. S. (2024): Geotectonics and geomorphology, Academic University Press
Method of Assessment, Measurement, & Evaluation:	<p>Semester End Examination: 30 Marks</p> <p>Mode: Written Examination</p> <p>Exam duration: 2 Hours</p>

	<p>Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts.</p> <p>Internal Assessment: 25 Marks</p> <p>Mode: Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 5 marks ,</p>
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Title of the Course:	GEOTECTONICS (PRACTICAL)
Discipline Specific Minor Paper Code:	GEO-DC-MJ-101B (PRACTICAL)
Semester = I (PRACTICAL)	
Credit = 01	
Objectives of the Course:	<ul style="list-style-type: none"> i) To understand the concept of map scale and its importance in cartography. ii) To utilise the notion of scale when examining topographical maps and comprehend the data they provide. iii) To identify, analyze and classify various types of rocks and minerals based on their physical and chemical properties. iv) To construct geological profiles or cross-sections along a given section of a geological map.
Learning Outcomes of the Course	<ul style="list-style-type: none"> i) Students will gain a solid foundation in map comprehension and application, as well as skills in laboratory techniques for analysing and documenting rock and mineral samples. ii) They will also gain a comprehensive understanding of geological maps and profiles, their construction, and interpretation, which are required for successfully reading and using maps in a variety of academic and professional settings.
<u>Course Content</u>	
Module: -1: Introduction to Map Scale	<ul style="list-style-type: none"> i) Concept and type of scale ii) Scale conversion; statement scale, ratio Scale (R.F.), graphical Scale (linear, comparative, diagonal and positive vernier); iii) Enlargement and reduction of map (Mathematical)
Module: -2: Minerals and Rocks	<ul style="list-style-type: none"> i) Identification of Mineral Specimens and their characteristics (Megascopic study): quartz, bauxite, chalcopyrite, feldspar, galena, calcite, hematite, magnetite, mica, and talc. ii) Identification of Rock specimens and their characteristics (Megascopic study): Sandstone, limestone, shale, basalt, granite, pegmatite, gneiss, marble, quartzite, conglomerate,

Module: -3: Geological Maps	i) Concepts of geological map ii) Construction of geological section (horizontal, uniclinal and folded structures with unconformities and intrusions) iii) Interpretation of prepared geological section.
Suggestive Readings:	<ol style="list-style-type: none"> 1. Bennison, George, Moseley, and Keith (2013): An Introduction to Geological Structures and Maps 7ed., Arnold Publication 2. Borradaile, Graham (2014): Understanding Geology through Maps, Elsevier, Inc. 3. Khan, MD.Z.A. (1998): Textbook of Practical Geography: Concept Publishing Company. 4. Maltman, A. (1990): Geological Map: An Introduction, Open University Press. 5. Monkhouse F. J and Wilkinson, H.R. (1971): Maps and Diagrams B.I. publications private limited, new Delhi 6. Platt, J.I., Selected Exercises upon Geological Map, Part I, Unwin, London. 7. Roy, A. K. (1966): Introduction to the study of geological maps, World Press Private Ltd 8. Saha, P.K. and Basu P. (2014): Advanced Practical Geography: Books and Allied, Kolkata 9. Sarkar, A. (2015): Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd. 10. Singh, R.L., Singh, R.P.B. (2018): Elements of Practical Geography, Kalyani Publishers. 11. Spencer, Edger W. (2016): Geologic Maps – A Practical Guide to Preparation and Interpretation, Waveland Press, Inc.
Method of Assessment, Measurement, & Evaluation:	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform <i>One</i> Practical carrying 7 marks; <i>One</i> Practical carrying 5 marks; and <i>One</i> practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce

Curriculum of Discipline Specific Course / Major Core)

SEMESTER-II				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Discipline Specific Course/ Major Core (DC-MJ)	GEO-DC-MJ-201A: Geomorphology (03)	GEO-DC-MJ-201B: Geomorphology (01)	04	75
Disciplinary Minor Course (IDC/DC-MN)	IDC/DC-MN-201 (04)		04	
Multidisciplinary Course (MDC)	MDC-201 (03)		03	
Ability Enhancement Compulsory (AEC)	AEC-2 (02)		02	
Skill Enhancement Course (SEC)	SEC-2 (03)		03	
Value Added Course (VAC)	VAC-2 (02)		02	
Internship / Apprenticeship/Project/ Community Engagement (IAPC)	IAPC-2 (02)		02	
Total			20	

Curriculum of Discipline Specific Course/ Major Core (DC-MJ) -201 for UG Program

Paper Name: **GEOMORPHOLOGY**

Title of the Course:	GEOMORPHOLOGY (THEORY)
Discipline Specific Minor Paper Code:	GEO-DC-MJ-201A (Theory)
Semester = II (THEORY)	
Credit = 03	
Objectives of the Course:	<ul style="list-style-type: none"> i) To inculcate fundamental knowledge of the different aspects of physical geography and geomorphology. ii) To gain expertise in discerning and acknowledging the dynamic tectonic and structural evolution of Earth's geosphere. iii) To enhance the ability to distinctly identify and characterize the various Earth surface processes and resulting landforms. iv) Understand the concept of applied geomorphology, its classification, and practical applications in fields like urban planning, resource management, and hazard mitigation.
Learning Outcomes of the Course	<ul style="list-style-type: none"> i) Learners will gain a comprehensive understanding of the fundamental principles and concepts of geomorphology. ii) Learners will be able to acquire a comprehensive understanding of the composition and dynamics of the earth's surface.

	<p>iii) Learners will gain insight into the dynamic nature of the earth's crust and its significance in the formation of landforms and will be able to summarize and critically evaluate different models explaining how landforms develop.</p> <p>iv) Learners will be able to identify various types of landforms and establish their connections.</p>
<u>Course Content</u>	
Module: -1: Introduction to Geomorphology and Denudational processes	<p>i) Geomorphology: Definition, Nature, Scope and Approaches of Geomorphology</p> <p>ii) Fundamental concepts in Geomorphology (Thornbury)</p> <p>iii) Concept, classification and application of Applied Geomorphology</p> <p>iv) Concept of Denudation; Weathering and Mass Wasting: Processes and resulting landforms</p>
Module: -2: Models of lanDC-MJape development and slope evolution	<p>i) Models of LanDC-MJape Development: Davis, Penck, King and Hack</p> <p>ii) Slope Evolution Theories: Davis, Penck, and King</p>
Module 3: Development of river networks and landforms	<p>i) Drainage pattern: Concept and types</p> <p>ii) Development of Drainage network and resultant landform: horizontal structure uniclinal structure folded structure faulted structure and</p>
Module: -4: Geomorphic processes and landforms	<p>i) Geomorphic process and landforms: Fluvial, Glacial, Fluvio-glacial, Periglacial, Aeolian, Fluvio-aeolian, Karst and Coastal processes</p>
Suggestive Readings:	<ol style="list-style-type: none"> 1. Bloom, A. L. (2011): Geomorphology - A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of India, New Delhi. 2. Bridges, E. M. (1990): World Geomorphology, Cambridge University Press, Cambridge. 3. Christopherson, Robert W. (2011): Geosystems - An Introduction to Physical Geography, 8 Ed., Macmillan Publishing Company 4. Fairbridge, R.W. (1968): The encyclopaedia of geomorphology, (Edge). Reinhold Book, New York 5. Huggett, R.J. (2011): Fundamentals of Geomorphology. Routledge, New York 6. Kale, V. S. and Gupta A. (2011): Introduction to Geomorphology, Orient Longman, Hyderabad. 7. Knighton, A. D. (1984): Fluvial Forms and Processes, Edward Arnold Publishers, London. 8. Selby, M.J. (2015): Earth's Changing Surface, Indian Edition, OUP 9. Singh, S., (2018): Geomorphology, Pravalika Publications, Allahabad 10. Singh, S., (2020): Physical Geography, Pravalika Publications, Allahabad 11. Skinner, Brian J., and Stephen C.P (2010): The Dynamic Earth: An Introduction to Physical Geology, 4th Edition, John Wiley, and Sons. 12. Summerfield, M.A. (1991): Global Geomorphology: An Introduction to the Study of Landforms. Longman, London.

	<p>13. Tarbuck, E. J., Lutgens, F. K., Tasa, D., & Tasa, D. (2019): Earth: an introduction to physical geology. Upper Saddle River: Pearson/Prentice Hall.</p> <p>14. Thornbury, W. D. (1969): Principles of Geomorphology, Wiley.</p>
Method of Assessment, Measurement, & Evaluation:	<p>Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts.</p> <p>Internal Assessment: 25 Marks Mode: Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 5 marks ,</p>

Title of the Course:	GEOMORPHOLOGY (PRACTICAL)
Discipline Specific Minor Paper Code:	GEO-DC-MJ-201B (PRACTICAL)
Semester = II (PRACTICAL)	
Credit = 01	
Objectives of the Course:	<p>i) To provide the idea of topographical map.</p> <p>ii) To analyse and interpret the morphometric aspects of the SOI topographical map.</p> <p>iii) Use SOI Topographical Maps to conduct a detailed relief analysis, identifying broad physiographic divisions and specific relief characteristics, as well as completing a variety of profile analyses such as representative, serial, composite, superimposed, projected, long, and cross profiles.</p> <p>iv) Perform morphometric analysis by delineating watersheds and river basins.</p>
Learning Outcomes of the Course	<p>i) Students will develop a thorough understanding of topographical maps and their applications in geomorphology, which will help them prepare for future academic and professional endeavours in geography and related subjects.</p> <p>ii) Learners will be able to identify and analyse the survey of India topographical map and they will be able to interpret the features and their interrelationship which will help them in future research in practical fields.</p> <p>iii) Learners will be able to prepare the different types of morphometric maps in the applied geomorphology and they can interpret the structural features of any area.</p>
<u>Course Content</u>	
Module: -1: Introduction to topographical map (SOI)	<p>i) Layout- old and new scheme (Open Series)</p> <p>ii) Conventional symbols and marginal information.</p>
Module: -2: Relief analysis using SOI topographical Map	<p>i) Broad physiographic division, Identification of relief features</p> <p>ii) Profile analysis (serial, composite, superimposed, projected; long and cross profile of river)</p>

	iii) Measurement of gradient iv) Transect chart Preparation
Module: -3: Morphometric analysis	i) Delineation of River basin ii) Stream Ordering (Strahler) and Bifurcation Ratio iii) Measurement and Mapping of Relative Relief (after Smith), Dissection Index (after Dov Nir), Drainage Density and Average Slope (after Wentworth)
Suggestive Readings:	1. Gupta K. K. and Tyagi V. C., (1992): Working with Maps, Survey of India, DST, New Delhi. 2. Mishra R.P. and Ramesh, A., (1989): Fundamentals of Cartography, Concept, New Delhi. 3. Saha, P.K. and Basu, P. (2019): Advanced Practical Geography, Books and Allied (P) Ltd., Kolkata. 4. Sarkar, A. (2015): Practical geography: A systematic approach. Orient Black Swan Private Ltd., New Delhi 5. Sen, P.K. (1989): Geomorphological Analysis of Drainage Basin: An Introduction to Morphometric and Hydrological Parameters, University of Burdwan. 6. Singh, R.L. and Singh, P.B. (2019): Elements of Practical Geography, Kalyani Publishers, New Delhi
Method of Assessment, Measurement, & Evaluation:	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform <i>One</i> Practical carrying 7 marks; <i>One</i> Practical carrying 5 marks; and <i>One</i> practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce

Curriculum of Discipline Specific Course / Major Core)

SEMESTER-III				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Discipline Specific Course/ Major Core (DC-MJ)	GEO-DC-MJ-301A: Climatology (03)	GEO-DC-MJ-301B: Climatology (01)	04	75
	GEO-DC-MJ-302A: Human Geography (03)	GEO-DC-MJ-302B: Human Geography (01)	04	
Disciplinary Minor Course (IDC/DC-MN)	IDC/DC-MN-301 (04)		04	
Multidisciplinary Course (MDC)	MDC-301 (03)		03	
Ability Enhancement Compulsory (AEC)	AEC-1 (02)		02	
Skill Enhancement Course (SEC)	SEC-1 (03)		03	
Internship / Apprenticeship/Project/ Community Engagement (IAPC)	IAPC-1 (02)		02	
Total			22	

Curriculum of Discipline Specific Course/ Major Core (DC-MJ) -301 for UG Program

Paper Name: CLIMATOLOGY

Title of the Course:	CLIMATOLOGY (THEORY)
Discipline Specific Minor Paper Code:	GEO-DC-MJ-301A (Theory)
Semester = III (THEORY)	
Credit = 03	
Objectives of the Course:	<ul style="list-style-type: none"> i) To provide ideas of the dynamic nature of the weather and climate and its importance. ii) To provide understanding and analytical capabilities among the learners about contemporary climatic issues in relation to anthropogenic activities.
Learning Outcomes of the Course	<ul style="list-style-type: none"> i) Learners will gain the ideas of climate as the result of mass and energy accumulations over time, and they will also be able to identify atmospheric processes and mechanisms. ii) Learners will understand the types and regional patterns of climates. iii) Learners will identify the natural causes of climate change and distinguish how these causes differ from anthropogenic causes of climate change.
Course Content	
Module: -1: Atmosphere, energy and temperature	<ul style="list-style-type: none"> i) Atmosphere: Origin, structure and composition. ii) Energy and Temperature in the Atmosphere: Insolation, heat budget, iii) Horizontal and vertical distribution of temperature; iv) Inversion of temperature- concept, types, causes and consequences.
Module: -2:	<ul style="list-style-type: none"> i) Atmospheric stability and instability

Stability, Cloud development and precipitation	<ul style="list-style-type: none"> ii) condensation, and precipitation-processes and forms; iii) mechanisms of precipitation- Bergeron-Findeisen theory, and collision and coalescence theory.
Module: -3: Atmospheric Circulation and climatic classification	<ul style="list-style-type: none"> i) Pressure belts and Planetary winds, jet streams ii) Indian monsoon: mechanisms (Thermal Engine theory and Jet Stream Theory) and impacts iii) Ocean- atmosphere interaction (El-Nino, La-Nina, ENSO, MJO). iv) Climatic classification: Basis and scheme after Köppen and Thornthwaite (1931 &1948).
Module: -4: Weather Disturbances	<ul style="list-style-type: none"> i) Air mass: Concept, origin and classification; ii) Fronts- frontogenesis and frontolysis, typology, and associated weather conditions. iii) Cyclone: Origin, characteristics, and impacts (tropical and mid-latitude cyclones), Super cyclones in Bay of Bengal (Aila and Amphan).
Suggestive Readings:	<ol style="list-style-type: none"> 1. Ahrens, C.D. (2012): Essentials of Meteorology: An Invitation to the Atmosphere. 9th Ed, Cengage Learning. 2. Barry R. G. and Carleton A. M. (2011): Synoptic and Dynamic Climatology, Routledge, UK. 3. Barry R. G. and Corley R. J. (1998): Atmosphere, Weather and Climate, Routledge, New York. 4. Critchfield H. J. (1987): General Climatology, Prentice-Hall of India, New Delhi. 5. Lal, D.S. (2012): Climatology. Sharda Pustak Bhawan. Lutgens, 6. Lutgens F. K., Tarbuck E. J., and Tasa D. (2019): The Atmosphere: An Introduction to Meteorology, Prentice-Hall, Englewood Cliffs, New Jersey. 7. Oliver J. E. and Hidore J. J. (2012): Climatology: An Atmospheric Science, Pearson Education, New Delhi. 1. Siddharth, K. (2016): A Climatology Atmosphere, Weather & Climate, Kitab Mahal, 2. Tarbuck, E.J. (1998): The Atmosphere: An Introduction to Meteorology, 9th Ed, Prentice Hall Inc. 3. Trewartha G. T. and Horne L. H. (1980): An Introduction to Climate, McGraw-Hill.
Method of Assessment, Measurement, & Evaluation:	<p>Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts.</p> <p>Internal Assessment: 25 Marks Mode: Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 5 marks ,</p>

Title of the Course:	CLIMATOLOGY (PRACTICAL)
Discipline Specific Minor Paper Code:	GEO-DC-MJ-301B (PRACTICAL)
Semester = III (PRACTICAL)	
Credit = 01	
Objectives of the Course:	<ul style="list-style-type: none"> i) To provide the basic skills of handling manual weather instruments and collection of weather information. ii) To provide the ideas of the construction of various climatic graphs for representation. iii) To give comprehensive knowledge about the analysis and interpretation of weather maps so that learners can understand the spatial behaviour and relationships of weather phenomena.
Learning Outcomes of the Course	<ul style="list-style-type: none"> i) Learners will gain the basic skills of handling manual weather instruments and the collection of weather information. ii) Learners will be able to construct climatic graphs for the representation of climatic data. iii) Learners will be able to analyse and interpret weather maps and will understand the spatial behaviour and relationships of weather phenomena.
<u>Course Content</u>	
Module -1: Measurement of weather elements by meteorological instruments	<ul style="list-style-type: none"> i) Hygrometer, ii) Maximum-minimum thermometer, iii) Fortin's barometer, iv) Rain gauge (Simon's), v) Anemometer and wind vane.
Module -2: Preparation of climatic graphs and charts	<ul style="list-style-type: none"> i) Taylor's Climograph, and Hythergraph ii) Star Diagram iii) Ergograph iv) Synoptic station model
Module-3: Interpretation of Indian daily weather map	<ul style="list-style-type: none"> i) Pre-monsoon, Monsoon and Post-monsoon: Temperature, pressure, Sky condition, wind direction and speed, Sea condition and Other weather phenomena.
Suggestive Readings	<ol style="list-style-type: none"> 1. Ahmed, I. (1994): Practical Geography, Jawahar Publishers and Distributors, New Delhi 2. Asnani, G. C., De, U. S., Hatwar, H. R., and Mazumdar, A. B. (2012): Monsoon Monograph, Indian Meteorological Department 3. Das, P.K. (2018): The Monsoons, The National Book Trust of India 4. Harrison, G. (2014): Meteorological measurements and instrumentation. John Wiley & Sons. 5. Khan, MD.Z.A. (1998): Textbook of Practical Geography: Concept Publishing Company. 6. Khullar, D. (2014): King's Practical Geography, Educational Publisher, Delhi

	<p>7. Monkhouse, F. J and Wilkinson, H.R. (1971): Maps and Diagrams B.I. publications private limited, new Delhi</p> <p>8. Saha, P.K. and Basu, P. (2019): Advanced Practical Geography, Books and Allied (P) Ltd., Kolkata.</p> <p>9. Sarkar,A. (1997): Practical Geography: A systematic approach, Orient Longman Ltd, Hyderabad</p> <p>10. Vazquez, T. (2018): Weather Map Handbook 2nd ed.</p>
Method of Assessment, Measurement, & Evaluation:	<p>20 Marks</p> <p>Mode: Laboratory-based Examination</p> <p>Exam duration: 2 Hours</p> <p>Question Pattern: Students shall perform One Practical carrying 7 marks; One Practical carrying 5 marks; and One practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce</p>

Curriculum of Discipline Specific Course/ Major Core (DC-MJ) -302 for UG Program

Paper Name: HUMAN GEOGRAPHY

Title of the Course:	HUMAN GEOGRAPHY (THEORY)	
Discipline Specific Minor Paper Code:	GEODC-MJ-302A (Theory)	
Semester = III (THEORY)		
Credit = 03		
Objectives of the Course:	i)	To acquire knowledge of Nature and Scope of Human Geography and Explore Human Races and Ethnicity.
	ii)	To Identify cultural regions based on language and religion, and analyze how these factors influence human interactions and societal structures.
	iii)	To trace the evolution of human societies from hunting and gathering to industrial and urban societies, identifying key characteristics and transitions in each stage.
	iv)	To trace the evolution of human societies from hunting and gathering to industrial and urban societies, identifying key characteristics and transitions in each stage.
Learning Outcomes of the Course	i)	Learners will acquire knowledge and develop an understanding of concepts, processes, elements, and methods of Human Geography.
	ii)	Learners will also acquire knowledge on the history and evolution of humans.

	<ul style="list-style-type: none"> iii) It helps learners understand the relationship between man and environment in the light of development-environment conflict. iv) Overall, Students will receive a thorough understanding of human races, demographic dynamics, and development indices, providing them with critical knowledge for future courses in geography, anthropology, and social science.
<u>Course Content</u>	
Module: -1: Introduction to Human Geography and	<ul style="list-style-type: none"> i) Nature, scope, approaches, elements, and recent trends. ii) Concept of space and society iii) Concept of race and ethnicity, evolution; major human races of the World (Huxley) and India (Guha & Risley).
Module: -2: Evolution of human societies and Culture	<ul style="list-style-type: none"> i) Hunting and food gathering, pastoral nomadism, subsistence farming industrial and urban societies. ii) Culture: Concept and types iii) Cultural hearth and Cultural regions (language and religion).
Module: -3: Human adaptation to the environment	<ul style="list-style-type: none"> i) Eskimo, Masai ii) Gond, Toda, Jarawa, and Khasi.
Module: -4: Population–Resource Relationship & Human Development	<ul style="list-style-type: none"> i) Underpopulation, overpopulation, optimum population; population-resource region of the World (Ackerman) and India (P. Sen Gupta). ii) HDI, GDI and GII: Concept and measure
Suggestive Readings:	<ol style="list-style-type: none"> 1. Bergman, E.F (1995): Human Geography-Culture, Connections and LanDC-MJape, Prentice Hall, New Jersey 2. Chisholm. (1975): Human Geography, Penguin Books, Harmondsworth. 3. Daniel, P.A. and Hopkinson, M.F. (1989): The Geography of Settlement, Oliver & Boyd, London. 4. Hussain M (2018): Human Geography, Rawat Publications 5. Johnston R; Gregory D, Pratt G. et al. (2018): The Dictionary of Human Geography, Blackwell Publication. 6. Jordan-Bychkov et al. (2016): The Human Mosaic: A Thematic Introduction to Cultural Geography. W. H. Freeman and Company, New York. Page 11 7. Norton. W. (2011): Human Geography, 4th Edition Oxford University press, Oxford 8. Pearce D. (1995): Tourism Today: A Geographical Analysis, 2nd edition, Longman Scientific & Technical, London 9. Pickering K. and Owen A. A. (1997): An Introduction to Global Environmental Issues, 2nd edition Rutledge, London. 10. Raw, M. (1986): Understanding Human Geography: A Practical Approach, Bell and Hyman. London 11. Rubenstein, J.M. (2012): The Cultural LanDC-MJape, 7th edition, Prentice Hall, Englewood Cliffs 12. Smith D M (1982): Human Geography: A Welfare Approach, Edward Arnold, London

Method of Assessment, Measurement, & Evaluation:	Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 5 marks ,
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Title of the Course:	HUMAN GEOGRAPHY (PRACTICAL)
Discipline Specific Minor Paper Code:	GEODC-MJ-302B (PRACTICAL)
Semester = III (PRACTICAL)	
Credit = 03	
Objectives of the Course:	i) To identify Human Races Using Anthropometric Indices. ii) To Explore Population Potential and Distribution. iii) To Compute Human Development Indices. iv) Critically assess the evolution of human development indices and their role in shaping policy and international development agendas
Learning Outcomes of the Course	i) Learners will be able to identify the different human races by using different human body measurement index. ii) Learners will be able to identify and analyse the spatial dynamics of human population and able to apply the techniques of population potential, mean and median centres of population. iii) Learners will gain proficiency of the various indicators and measures of human development and able to calculate human development indices, and gender inequality index.
<u>Course Content</u>	
Module: -1: Identification of human race	i) Cephalic Index ii) Nasal Index iii) Facial Index
Module: -2: Measures of spatial distribution and interaction	i) Population potential ii) Mean centre of population.
Module: -3: Measures of Human Development	i) HDI (UNDP 2014) ii) GDI (UNDP 2014) iii) Gender Inequality Index (GII).

<p>Suggestive Readings:</p>	<ol style="list-style-type: none"> 1. Eroje, M. A., Fawehinmi, H. B., Jaja, B. N., & Yaakor, L. (2010). Cephalic index of Ogbia tribe of Bayesla state. <i>Int J Morphol</i>, 28(2), 389-392. 2. Mohan, S. M., Leander, D., Roopesh, R., Abiraj, K. R., Ali Fathima, S., Pratheesh, A. P., & Krishna, A. S. Evaluation and establishment of norms for facial index in Kerala population-a cross sectional study. 3. Craig, J. (1972): Population Potential and Population Density. <i>Area</i>, 4(1), 10–12. http://www.jstor.org/stable/20100603 4. Craig, J. (1987): Population Potential and Some Related Measures. <i>Area</i>, 19(2), 141–146. http://www.jstor.org/stable/20102432 5. Gaye, A., Klugman, J., Kovacevic, M., Twigg, S., & Zambrano, E. (2010): Measuring key disparities in human development: The gender inequality index. <i>Human development research paper</i>, 46(10). 6. Omotoso, D. (2019). Anthropometric evaluation of nasal height, nasal breadth and nasal index among Bini children in Southern Nigeria. 7. Pal S. K. (1998): <i>Statistics for Geoscientists</i>, Tata McGraw Hill, New Delhi. 8. Sarkar A (2013): <i>Quantitative Geography Techniques And Presentations</i> 1st Edition, Orient Blackswan 9. UNDP technical notes (2021): https://hdr.undp.org/system/files/documents/technical-notes-calculating-human-development-indices.pdf
<p>Method of Assessment, Measurement, & Evaluation:</p>	<p>Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Students shall answer <i>One</i> question carrying 10 marks out of <i>Two</i> given questions; <i>Three</i> questions carrying 5 marks each out of given <i>Six</i> questions; <i>Five</i> MCQ types questions carrying 1 mark. Questions carrying 10 marks will have at least three parts and questions carrying 5 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 5 marks ,</p>

Curriculum of Discipline Specific Course / Major Core)

SEMESTER-IV				
Course Type	Course Code-Course Name (Credits)		Total Credits	Marks
	Theory	Practical		
Discipline Specific Course/ Major Core (DC-MJ)	GEO-DC-MJ-401A: Geography of India (03)	GEO-DC-MJ-401B: Geography of India (01)	04	75
	GEO-DC-MJ-402A: Population Geography (03)	GEO-DC-MJ-402B: Population Geography (01)	04	75
	GEO-DC-MJ-403A: Soil & Biogeography (03)	GEO-DC-MJ-403B: Soil & Biogeography (01)	04	75
Disciplinary Minor Course (IDC/DC-MN)	IDC/DC-MN-401 (04)		04	
Ability Enhancement Compulsory (AEC)	AEC-4 (02)		02	
Value Added Course (VAC)	VAC-3 (02)		02	
Total			20	

Curriculum of Discipline Specific Course/ Major Core (DC-MJ) -401 for UG Program

Paper Name: GEOGRAPHY OF INDIA

Title of the Course:	GEOGRAPHY OF INDIA (PRACTICAL)
Discipline Specific Minor Paper Code:	GEO-DC-MJ-401B (PRACTICAL)
Semester = IV (PRACTICAL)	
Credit = 01	
Objectives of the Course:	<ul style="list-style-type: none"> i) To provide the knowledge about the different types of maps and their uses in different fields. ii) To know the concept, typology, terminologies, uses and properties of different types of Map projections. And also to choose the right one for specific mapping tasks. iii) To provide the knowledge about the different cartograms and thematic mapping.

Learning Outcomes of the Course	<ul style="list-style-type: none"> i) The learners will be able to use of different types of maps in their livelihood as well as academic purposes. ii) Learners will be able to applied different types of map projection for map making in their academic purposes. iii) Learners will be able to represents the different physical and socio-cultural data using different cartograms and thematic mapping.
<u>Course Content</u>	
Module: -1: Map pointing	<ul style="list-style-type: none"> i) Physical (physiographic divisions, mountain peaks, pass, major rivers, lake, coast, soil, and vegetation zones) ii) Political and cultural features (major cities, ports, highways, major producing centres-coal, petroleum and iron ore)
Module: -2: Map projection	<ul style="list-style-type: none"> i) Planar projection (Polar Zenithal Gnomonic Projection) ii) Conical projection (Simple Conical Projection with One Standard Parallel) iii) Cylindrical projection (Cylindrical Equal Area Projection) iv) Concept and application of UTM projection.
Module: -3: Representation of socio-economic data	<ul style="list-style-type: none"> i) Line, Bar, Dot and proportional sphere diagram ii) Proportional circle, pie and proportional divided circle diagram iii) Thematic mapping using isopleth, choropleth and chorochromatic map.
Suggestive Readings:	<ol style="list-style-type: none"> 1. Das, D.C & Roy, P. (2024): An Analytical Study of Map Projections, Bharti Publicatios, New Delhi 2. Kennedy, M., Kopp, S. (2011): Understanding Map Projections, Esri Press. 3. Khan, Z.A. (1998): Text Book Of Practical Geography, Concept Publishing Company, New Delhi 4. Kimerling, A.J., Buckley, A.R., Muehrcke, P.C., Muehrcke, J.O. (2011): Map Use: Reading, Analysis, Interpretation, 7th ed, Esri Press. 5. Mishra, R.N & Sharma, P.K. (): Practical Geography-Methods and Techniques, Pareek Publication, New Delhi. 6. Monkhouse, F.J., Wilkinson, H.R. (1971): Maps and Diagrams: Their Compilation and Construction, 3rd ed (2017 reprint), Alphaneumera-Kolkata. Pearson II, 7. Pearson, F. (1990): Map Projections: Theory and Applications 2nd ed, CRC Press. 8. Robinson, A.H., Morrison, J.L., Phillip, C.M., Kimerling, A.J., Gupstill, S.C. (1995): Elements of Cartography, 6th ed, Wiley. 9. Saha, P.K. and Basu P. (2014): Advanced Practical Geography: Books and Allied, Kolkata 10. Sarkar, A. (2015): Practical Geography: A Systematic Approach, 3rd ed, Orient Blackswan Private Ltd.

	11. Singh, R.L., Singh, R.P.B. (2018): Elements of Practical Geography, Kalyani Publishers.
Method of Assessment, Measurement, & Evaluation:	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform <i>One</i> Practical carrying 7 marks; <i>One</i> Practical carrying 5 marks; and <i>One</i> practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce

Curriculum of Discipline Specific Course/ Major Core (DC-MJ)-402 for UG Program

Paper Name: **POPULATION GEOGRAPHY**

Title of the Course:	POPULATION GEOGRAPHY (THEORY)
Discipline Specific Minor Paper Code:	GEO-DC-MJ-402A (Theory)
Semester = IV (THEORY)	
Credit = 03	
Objectives of the Course:	<ul style="list-style-type: none"> i) To know the concept of population geography and different theories, concepts related to population dynamics. ii) To study about the determinants and measures of human population. iii) It will help in knowing various kinds of demographic problems and to understand the population policies in developed & developing countries.
Learning Outcomes of the Course	<ul style="list-style-type: none"> i) Learners will gain the concept of population geography and will be able to understand the distribution of population and its problems, population dynamics over space and time. ii) Learners could understand different population policies & its importance and the contemporary population issues, and mitigation strategies.
<u>Course Content</u>	
Module: -1: Introduction to Population Geography & Population Dynamics	<ul style="list-style-type: none"> i) Definition, scope, contents, and development of population geography; Population geography and demography relations. ii) Sources of population data. iv) Fertility, mortality and migration.

Module: -2: Spatial pattern of population and population composition	<ul style="list-style-type: none"> i) Growth, density, and distribution in World and India. ii) Age, sex, social and economic composition of population.
Module: -3: Population theory, model and policy	<ul style="list-style-type: none"> i) Malthusian and Marxian theories, Demographic Transition Model, Ravenstein's Laws of migration, and Mobility Transition Model (Zelinisky). ii) Fertility influencing policies (Pro-natalist and Anti-natalist), migration influencing policies; National Population Policy of India-2010; Population Policy of China (One Child Policy).
Module: -4: Contemporary population issues in India	<ul style="list-style-type: none"> i) Poverty, malnutrition and unemployment. ii) Maternal and child health issues, labour migration, and diaspora.
Suggestive Readings:	<ol style="list-style-type: none"> 1. Banerjee Guha, S. ed. (2014): Space, Society & Geography, Rawat Publication, Delhi. 2. Bardhan, P. (2013): Poverty, Age Structure & Political Economy in India, Oxford University Press. 3. Barrett H. R. (1995): Population Geography, Oliver and Boyd. 4. Bhende A. & Kanitkar T. (2010): Principles of Population Studies, Himalaya Publishing House. 5. Chandna R. C. & Sidhu M. S. (1980): An Introduction to Population Geography, Kalyani Publishers. 6. Clarke, J. I. (1965): Population Geography, Pergamon Press, Oxford. 7. Fellmann, J. D., Getis, A., & Getis, J. (2010): Human Geography-LanDC-MJape of Human Activity, McGraw Hill. 8. Hussain, M. (2017): Models in Geography, Rawat Publication. 9. Jones, H. R. (2010): Population Geography, 3rd ed. Paul Chapman, London. 10. Jhingan, M.L., Bhat, B.K. Desai, J.N. (2016): Demography (3rd.), Vrinda Publication, Delhi. 11. Lutz W., Warren C. S. & Scherbov S. (2014): The End of the World Population Growth in the 21st Century, Earthscan. 12. Newbold, K. B. (2019): Population Geography- Tools and Issues, Rowman and Littlefield Publishers. 13. Pacione, M. (1986): Population Geography- Progress and Prospect, Taylor, and Francis. 14. Wilson, M. G. A. (1968): Population Geography, Nelson.
Method of Assessment, Measurement, & Evaluation:	<p>Semester End Examination: 30 Marks</p> <p>Mode: Written Examination</p> <p>Exam duration: 2 Hours</p> <p>Question Pattern: Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts.</p> <p>Internal Assessment: 25 Marks</p>

	Mode: Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 5 marks ,
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Title of the Course:	POPULATION GEOGRAPHY (PRACTICAL)
Discipline Specific Minor Paper Code:	GEO-DC-MJ-402B (PRACTICAL)
Semester = IV (PRACTICAL)	
Credit = 01	
Objectives of the Course:	<ul style="list-style-type: none"> i) To handle and analyse the population data and its measures. ii) To develop the skill about various measurements of vital statistics of the human population.
Learning Outcomes of the Course	<ul style="list-style-type: none"> i) Learners will be able to analyse the population data, determine the projected population and measure the densities of population. ii) Learners will be skilled in various measurements of vital statistics of the human population.
<u>Course Content</u>	
Module: -1: Population data analysis	<ul style="list-style-type: none"> i) Decadal growth rate ii) Population projection (trend extrapolation: linear, geometric). iii) Population density (arithmetic and agricultural). iv) Age-sex pyramid (developed, developing and under developed countries).
Module: -2: Measures of fertility and mortality	<ul style="list-style-type: none"> i) Fertility (CBR, ASFR, TFR) ii) Mortality (CDR, IMR, MMR)
Module: -3: Life Table Preparation	<ul style="list-style-type: none"> i) Age interval (x), Number of survivors (lx), Number of deaths (dx), Probability of dying (qx), Probability of surviving (px), Life expectancy (ex)
Suggestive Readings:	<ol style="list-style-type: none"> 1. Alvi, Z: Statistical Geography (2012): Methods and Applications, Rawat Pub. 2. Caselli, G., Wunsch, G., & Vallin, J. (2015): Demography. Analysis and synthesis, a treatise in population (Four volume set). Oxford: Academic. 3. Mahmood, A. (1999): Statistical Methods in Geographical Studies: Student Edition, Rajesh; New Edition. 4. Monkhouse, F. J. and Wilkinson, H. R., (1973): Maps and Diagrams, Methuen, London. 5. Jhingan, M.L., Bhat, B.K. Desai, J.N. (2016): Demography (3rd), Vrinda Publication, Delhi 6. Sarkar, A. (2015): Practical geography - A systematic approach. Orient Black Swan Private Ltd., New Delhi 7. Singh, L.R. (2010): Fundamentals of Practical Geography, Sarada Pustak Bhavan, Allahabad. 8. Singh, R. L. & Singh, R. P. B. (2015): Elements of Practical Geography, Kalyani Publishers. 9. Thomas, R. K. (2018): Concepts, Methods, and Practical Applications in Applied Demography: An Introductory Textbook. springer publication.

	10. Das, N.G.: Statistical Methods 11. Sinha & Zacharia: Elements of Demography
Method of Assessment, Measurement, & Evaluation:	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform <i>One</i> Practical carrying 7 marks; <i>One</i> Practical carrying 5 marks; and <i>One</i> practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce

Curriculum of Discipline Specific Course/ Major Core (DC-MJ) -403 for UG Program

Paper Name: **SOIL & BIOGEOGRAPHY**

Title of the Course:	SOIL & BIOGEOGRAPHY (THEORY)
Discipline Specific Minor Paper Code:	GEO-DC-MJ-403A (Theory)
Semester = IV (THEORY)	
Credit = 03	
Objectives of the Course:	<ul style="list-style-type: none"> i) To provide knowledge on the various Pedogenetic processes for the development of soil. ii) To inculcate fundamental knowledge of the different physical and chemical properties of soil. iii) To decipher knowledge about land evaluation. iv) To properly understand the interaction between all the elements of the environment. v) Analysing environmental issues related to flora and fauna to find the right environmental protection strategy.
Learning Outcomes of the Course	<ul style="list-style-type: none"> i) Learners will gain a comprehensive understanding of the Pedogenesis. ii) Learners will be able to know how different Pedogenetic processes create different types of soils. iii) Learners will be able to know about land suitability. Besides, they will also acquire knowledge on the various modes of soil erosion and degradation iv) Learners will be able to know about the methodological knowledge about diagrammatic presentation of pedological data and they will be able to evaluate land quality quantitatively. v) Learners will perceive the physical environment and organisms of the planet clearly.

	vi) Learners will acquire the ability to solve environmental problems related to the habitats of organisms
<u>Course Content</u>	
Module: -1: Soil and Soil properties	<ul style="list-style-type: none"> i. Soil: Concept, components and significance ii. Soil forming factors iii. Soil properties: Physical, chemical and biological.
Module: -2: Pedogenetic processes and soil classification	<ul style="list-style-type: none"> i. Laterization, podzolization, calcification, salinization, and gleization. ii. Soil classification by USDA
Module: -3: Introduction to Biogeography, Concept of Ecosystem and biodiversity	<ul style="list-style-type: none"> i). Biogeography: concept, scope, and content ii) Biogeographical regions of the world and India. iii) Ecosystem: Concept, components, types, structures (trophic levels, food chain, and food web), hierarchy (biosphere, biomes, ecosystem, and biotope), and ecological pyramids (Energy, number, and biomass); Ecological succession; iv). Biodiversity: concept and types.
Module: -4: Biogeochemical cycles and Major biomes of the World	<ul style="list-style-type: none"> i) Biogeochemical Cycle: Carbon, Phosphorus and Nitrogen cycle and their significance. ii) Biome: Tropical rainforest, hot desert, mangrove.
Suggestive Readings:	<ol style="list-style-type: none"> 1. Chapman, J.L. and Rens, M.J. (1993): Ecology: Principle and Applications, Cambridge University Press, Cambridge. 2. Dash, M.C. (2011): Fundamental of Ecology, 2nd ed., Tata McGraw-Hill, New Delhi. 3. Huggett, R. (1998): Fundamentals of Biogeography, Routledge, London: 4. Joy, T. et al. (1989): Human Impact on The Ecosystem, Oliver and Boyd, London. 5. Kendeigh, S.C. (1975): Ecology with Special Reference to Man and animals, Prentice Hall, 6. Khinchi, Shyam S. (editor) (2015): Biodiversity Distribution and Conservation, Pointer 7. Kormondy, E.J. (1991): Concepts of Ecology, Prentice Hall India, New Delhi. 8. Kormondy, E.J. (1996): Concept of Ecology, 4th ed., Prentice- Hall, India, New Delhi 9. Myers, A. A. and Giller, P.S. (editors) (1988): Analytical Biogeography: An Integrated Approach to the Study of Animal and Plant Distribution. Chapman and Hall, London 10. Nebel, J.B. (1981): Environmental Science, Prentice Hall, New York. 11. Odum, E.P. (1971): Fundamentals of Ecology, W.B. Sanders, Philadelphia. 12. Sharma, P. D. (1996): Ecology and Environment, 7th edition, Rastogi Publications, Meerut. 13. Shukla, R.S. and Chandel, P.S. (1930): Plant Ecology and Soil Science, S Chand, New Delhi. 14. Simmons, I. G. (1981): The Ecology of Natural Resources, ELBS/ Edward Arnold, London.

	<p>15. Simmons, I.G. (1980): Bio-geographical Processes, George Allen and Unwin, London.</p> <p>16. Spellerberg, I. F. and Sarwyer, J. W. D. (1999): An Introduction to Applied Biogeography, University Press, Cambridge.</p> <p>17. Brady, N.C. and Weil, R.R. (1996): The Nature and Properties of Soil, 11th edition, Longman, London: Cambridge University Press, Cambridge.</p> <p>18. Daji, J.A., Kadam, J.R., Patil, N.D. 1996. A Textbook of Soil Science, Media Promoters and Publishers.</p> <p>19. Duchaufour, P. (1982). Pedology: Pedogenesis and classification. Springer Dordrecht. https://doi.org/10.1017/978-94-011-6003-2.</p> <p>20. Franzmeier, D.P., McFee, W.W., Graveel, J.G., Kohnke, H. 2016. Soil Science Simplified, 5th ed, Waveland Press.</p> <p>21. Gummireddy, S. (2021). A Textbook of Agropedology. AGROBIOS (INDIA).</p> <p>22. Morgan, R.P.C. 1995. Soil Erosion and Conservation, 2nd edition, Longman.</p> <p>23. Weil, R.R. and Brady, N.C. 2016. The Nature and Properties of Soil, 15th edition, Pearson.</p> <p>24. White, R. 2016. Principles and Practice of Soil Science: The Soil as a Natural Resource, Blackwell.</p>
<p>Method of Assessment, Measurement, & Evaluation:</p>	<p>Semester End Examination: 30 Marks Mode: Written Examination Exam duration: 2 Hours Question Pattern: Question Pattern: Students shall answer 4 questions carrying 6 marks out of 8 given questions (2 questions from each module); 6 MCQ types questions carrying 1 mark. Questions carrying 6 marks will have at least two parts. Internal Assessment: 25 Marks Mode: Tutorial/Assignment/Term paper Preparation 10 marks and Presentation 5 marks; Class Attendance 5 marks and Classroom Activities 5 marks ,</p>

<p>Title of the Course:</p>	<p>SOIL & BIOGEOGRAPHY (PRACTICAL)</p>
<p>Discipline Specific Minor Paper Code:</p>	<p>GEO-DC-MJ-403B (PRACTICAL)</p>
<p>Semester – IV (PRACTICAL)</p>	
<p>Credit = 01</p>	
<p>Objectives of the Course:</p>	<p>i) To provide the idea about the standard classification of soil texture and its graphical presentation.</p> <p>ii) To analyse and interpret the particle size of soil aggregate.</p> <p>iii) To provide the idea about the graphical presentation of soil properties along the different horizons of soil profile.</p> <p>iv) To provide a quantitative method of land evaluation.</p> <p>v) To measure biodiversity and to determine the temporal loss of species using living planet index and red list index.</p> <p>vi) To assess the ecological footprint</p>

Learning Outcomes of the Course	<ul style="list-style-type: none"> i) Learners will be able to know about the methodological knowledge about diagrammatic presentation of pedological data and they will be able to evaluate land quality quantitatively. ii) Learners will be able to measure the richness and evenness of biodiversity. iii) Learners will be able to calculate and determine the temporal loss of different species. iv) Learners will be able to measure the level of ecological footprint.
<u>Course Content</u>	
Module: -1: Soil type and particle size determination	<ul style="list-style-type: none"> i). Determination of soil type by ternary diagram ii) Particle size distribution analysis by sieving method
Module: -2: Measurement of soil nutrient and soil pH	<ul style="list-style-type: none"> i) Measurement of soil nutrient (NPK) and Soil pH by using soil kit
Module: -3: Measures of biodiversity	<ul style="list-style-type: none"> i) Simpson's evenness index and Shannon-Weiner diversity index ii) Living planet index (WWF) and Red List Index (RLI).
Suggestive Readings:	<ol style="list-style-type: none"> 1. Almond, R.E.A., Grooten, M., Juffe Bignoli, D. & Petersen, T. (Ed). (2022): Living Planet Report 2022 – Building a nature-positive society, WWF, Gland, Switzerland. 2. Loh, J., Green, R. E., Ricketts, T., Lamoreux, J., Jenkins, M., Kapos, V., & Randers, J. (2015). The Living Planet Index: using species population time series to track trends in biodiversity. <i>Philosophical Transactions of the Royal Society B: Biological Sciences</i>, 360(1454), 289-295. 3. Wackernagel, M., Lillemor Lewan, & Carina Borgström Hansson. (1999). Evaluating the Use of Natural Capital with the Ecological Footprint: Applications in Sweden and Subregions. <i>Ambio</i>, 28(7), 604–612. http://www.jstor.org/stable/4314966 4. Westveer, J, Freeman, R., McRae, L., Marconi, V., Almond, R.E.A, and Grooten, M. (2022): A Deep Dive into the Living Planet Index: A Technical Report. WWF, Gland, Switzerland. (https://www.livingplanetindex.org/documents/LPR_2022_TechnicalSupplement_DeepDiveLPI.pdf) 5. World Wildlife Fund Hong Kong. (2013): Hong Kong Ecological Footprint Report 2013 (Appendix). WWF Hong Kong. http://awsassets.wwfhk.panda.org/downloads/hong_kong_ecological_footprint_report_2013_appendix.pdf 6. Andrews, S. S., Karlen, D. L., & Mitchell, J. P. (2012). A comparison of soil quality indexing methods for vegetable production systems in Northern California. <i>Agriculture, Ecosystems & Environment</i>, 90(1), 25–45. doi:10.1016/s0167-8809(01)00174-8. 7. USDA: United States Department of Agriculture. 2014. Soil Survey and Laboratory Methods Manual, Soil Survey Investigations Report No. 51. 8. Biswas, T.D. and Mukherjee, S.K. (1997): Textbook of Soil Science, Tata McGraw Hill. 9. Brady, N.C. and Weil, R.R. (1996): The Nature and Properties of Soil, 11th edition, Longman, London: Cambridge University Press, Cambridge.

Method of Assessment, Measurement, & Evaluation:	20 Marks Mode: Laboratory-based Examination Exam duration: 2 Hours Question Pattern: Students shall perform <i>One</i> Practical carrying 7 marks; <i>One</i> Practical carrying 5 marks; and <i>One</i> practical carrying 4 marks. 4 marks for submission of the Laboratory Notebook duly signed by the Teacher(s) followed by the performance in a viva-voce
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