KANNUR UNIVERSITY

(Abstract)

Five Year Integrated Masters Programme (FYIMP) in Geography offered by the Department of Geography, SAT Campus, Payyannur - Scheme and Syllabus -Approved and Implemented w e f the academic year 2025-26 -Orders issued.

ACADEMIC C SECTION

ACAD C/ACAD C3/8810/2025 Dated: 11.08.2025

Read:-1. U O No ACAD D/ACAD D5/23315/2023(I) dated 22.02.2025.

2. Circular No ACAD C/ACAD C3/12564/2023 dated 05.03.2025

3. E mail dated 28.04.2025 from the Head, Dept. of Geography.

4. E mail dated 21.05.2025 from the Dean Faculty Of Science, Kannur University

5. E mail dated 21.05.2025 from the Head, Dept. of Geography

6.Minutes of the meeting of all Deans of Faculties held on 04.06.2025

7.Orders of Vice Chancellor in file No. Acad C/AcadC3/2948/2025 dated 04.06.2025

ORDER

1) The proposals to start 12 Five Year Integrated Masters Programmes and 3 Integrated Teacher Education Programmes at the Teaching Departments and Centres of the University were approved, as per the paper read as (1) above,

2) Subsequently, directions were given to all Heads of the Departments, concerned to submit the entire Syllabus (all semesters) of FYIMP to be offered by their Department w e f the academic year 2025-26 with the minutes of Department Council, vide the paper read (2) above.

3) Accordingly, the Head of the Department, Department of Geography vide the paper read (3) above, submitted the Scheme and Syllabus of FYIMP Geography Programme ,along with the Minutes of the meeting of the Department Council , for approval and implementation w e f the Academic year-2025 -26 .

4)The Scheme and Syllabus, submitted by the Head of the Department , were forwarded to the Dean, Faculty Science for verification and remarks.

5) The Dean, Faculty of Science (vide paper read 4), offered remarks on the syllabus (Semesters 1 to 8) of the Five-Year Integrated Master's Programme in Geography, offered by the Department of Geography, SAT Campus of the University.

6) Subsequently the Head of the Department, Department of Geography vide the paper read (5) above, submitted the revised Scheme and Syllabus of FYIMP Geography Programme , for approval and implementation w e f the Academic year-2025 -26.

7)The Dean Faculty of Science (vide paper read 6) recommended to approve the syllabus (1- 8 semester) of Five year Integrated Masters Programme in Geography offered by the Department of Geography , SAT Campus of the University

8)The Vice Chancellor after considering the recommendation of the Dean, Faculty of Science and in exercise of the powers of the Academic Council conferred under Section 11(1) Chapter III of the Kannur University Act, 1996 and all other enabling provisions read together with, approved the Scheme and Syllabus of the Five Year Integrated Masters Programme in Geography at the Department of Geography, Swami Anandha Theertha Campus, Payyannur of the University and accorded sanction to implement the same w.e.f. 2025-26 academic year , subject to reporting to the Academic Council.

9) The approved Scheme and syllabus of FYIMP in Geography offered by the Dept. of Geography, SAT campus of the University, is attached with this U.O. and uploaded in the website of the University (www.kannuruniv.ac. in)

10)Orders are issued accordingly.

Sd/-

Bindu K P G

DEPUTY REGISTRAR (ACADEMIC)

For REGISTRAR

To: 1. The Controller of Examination (Through PA to CE)

2. The Head Dept. of Geography, SAT Campus of the University

Copy To: 1.Computer programmer

2.PS to VC/ PA to R

3.DR/AR(Acad), EXCI, EP IV

4.IT Cell (for uploading on the website)

5.JR II Exam

6.SF/DF/FC

Forwarded / By Order

SECTION OFFICER

KANNUR UNIVERSITY

DEPARTMENT OF GEOGRAPHY

Syllabus

Five Year Integrated Master Programme in Geography
(FYIMP 2025)

Swami Anandatheertha Campus, Payyanur
Edat (P O), Payyanur – 670327. Tel: 04972 806401.
e-mail: hodgeography@kannuruniv.ac.in

INTRODUCTION

'Geography is all around us, it is an inextricable part of our everyday life' (Holt-Jensen, 2009). Human interactions with each other and the environment are rooted in geographical understandings, as well as the opportunities and constraints of geographical circumstance. It would not be an exaggeration, if we argue that who we are is also been often shaped in part by where we are. It is indeed worth noting here that, this linkage is not one-way relation rather a dialectical one. The environmental conditions affect humans and provide them with opportunities to act and in return human too take an active role in the production and reproduction of environmental and geographical milieu. The scope of geographical approaches and techniques, therefore, involves everything from local land-use decisions to international conflict and global/epochal crisis like climate change.

RELEVANCE OF GEOGRAPHY IN GRADUATE STUDIES PROGRAMME

Geographical education at graduate level is intended to give exposure to students about various components of the "Earth System". It covers both the Physical as well as the Human components. Be it the Geomorphology dealing with the structure of the earth, Climatology giving understanding of various weather phenomena and processes, Environmental Geography focusing on the functioning of the ecosystem to the human aspects like Population Studies, Urban Geography, Resource Geography etc. Along with the basic understating of the courses a wide range of skills used in the discipline of sciences and social sciences are also imparted.

The skill of map making using various Cartographic Techniques, use of GIS and remote sensing software, understanding statistical techniques, field survey and project report writing etc. makes the student of Geography more resourceful. It enables them to collect and analyze data both primary and secondary data, think critically, communicate effectively and present the findings for the users. The inculcation of such skills makes a geography student a good observer, increases confidence, spirit of teamwork, leadership skills etc. which are key requirement of any organization looking for employees.

GEOGRAPHY AS A CAREER OPTION

The wide range of sub-disciple which is taught to the graduates exposes them to various locational and procedurals aspects of the Earth systems. The relevance of geography lies in its ability to offer a comprehensive overview of issues by functioning as a bridge science that connects the natural sciences with the social sciences. This dual perspective is particularly significant in addressing complex global challenges, such as climate change, resource management, and sustainable development.

Geography education integrates theoretical knowledge with practical skills, making students versatile and resourceful:

Technical Skills:

- Map-making using cartographic techniques.
- Proficiency in GIS and remote sensing software.
- Statistical analysis and data interpretation.
- Field surveys and project report writing.

Soft Skills:

- Critical thinking and problem-solving.
- Effective communication and data presentation.
- Teamwork, leadership, and confidence-building.

Geography stands out as a transformative discipline that equips students with diverse knowledge and skills, opening doors to countless career paths. By bridging physical and human systems, it offers a multidisciplinary perspective that extends far beyond traditional boundaries. Geography doesn't confine its students to a single specialization but instead introduces them to a spectrum of fields, empowering them to choose careers aligned with their passions and aspirations. It's a field where curiosity meets opportunity, making it a perfect choice for those seeking dynamic and fulfilling professional journeys.

Programme Outcomes (POs)

Program Outcomes (POs) serve as a foundational framework defining the skills, knowledge, and attributes that students of Kannur University are expected to acquire upon comple- tion of a specific academic program. Tailored to the unique goals of each program, POs articulate the overarching learning objectives that guide curriculum design and assessment. These outcomes encompass a diverse range of competencies, including critical thinking, problem-solving, effective communication, and discipline-specific expertise. POs play a crucial role in shaping educational experiences, ensuring alignment with academic stan- dards and industry expectations. By articulating clear and measurable expectations, POs contribute to the continuous improvement of academic programs and provide a roadmap for students to develop into well-rounded, competent professionals within their chosen fields.

PO1	**Critical Thinking and Problem-Solving**-Apply critical thinking skills to analyze information and develop effective problem-solving strategies for tackling complex challenges.
PO2	**Effective Communication and Social Interaction**-Proficiently express ideas and engage in collaborative practices, fostering effective interpersonal connections.
PO3	**Holistic Understanding**-Demonstrate a multidisciplinary approach by integrating knowledge across various domains for a comprehensive understanding of complex issues.
PO4	**Citizenship and Leadership**-Exhibit a sense of responsibility, actively contribute to the community, and showcase leadership qualities to shape a just and inclusive society.
PO5	**Global Perspective**-Develop a broad awareness of global issues and an understand- ing of diverse perspectives, preparing for active participation in a globalized world.
PO6	**Ethics, Integrity and Environmental Sustainability**-Uphold high ethical standards in academic and professional endeavors, demonstrating integrity and ethical decision-making. Also acquire an understanding of environmental issues and sustainable practices, promoting responsibility towards ecological well-being.

PO7	**Lifelong Learning and Adaptability**-Cultivate a commitment to continuous self-directed learning, adapting to evolving challenges, and acquiring knowledge throughout life.

Programme Specific Outcomes (PSOs)

PSO1	Mold young geographers with thorough knowledge in the process and mechanisms of the functioning of bio-physical and social world we live in.
PSO2	Demonstrate critical thinking aptitude by involving geographical elements such as space, place and environment.
PSO3	Proficiency in carrying out field oriented geographical research tools to address emergent epochal crisis of the Anthropocene experienced at various levels from global, regional, and local.
PSO4	Acquire practical skills and experience required for the application of Geoinformatics in the spatial decision making to address issues pertains to sustainability, social justice and development.
PSO5	Interpret and analyze the data to understand the complex geographic reality and enhance the skills level for effective visual portrayal of the spatial and non-spatial results.
PSO6	Develop proficiency in effective communication of conceptual and practical geographical knowledge to both scientific and public audiences.
PSO7	Work effectively in interdisciplinary and multicultural real-world contexts to combine theory and practice and forge collaborations and partnerships with academia, industry and local communities to contribute enduring solutions to issues at various scales for both humans and other-than-human.

Course Structure: FYIMP Geography

Type	Course	Code	Credit	Level
SEMESTER - I				
DSC	Introduction to Dynamic Earth (A-1)	KU01DSCGEO101	4	100
	B-1		4	
	C-1		4	
AEC	Language (AEC-1)		3	
	Language (AEC-2)		3	
MDC	MDC -1		3	
Minimum Credit Requirement for SEMESTER I			21	
SEMESTER - II				
DSC	Space and Society (A-2)	KU02DSCGEO101	4	100
	Fundamentals of Mapping (Practical) (A-3)	KU02DSCGEO102	4	
	B/C-2		4	
	B/C-3		4	
AEC	Language (AEC-3)		3	
MDC	MDC-2		3	
Minimum Credit Requirement for SEMESTER II			22	
SEMESTER - III				
DSC	Geomorphology (A-4)	KU03DSCGEO201	4	200
	Geostatistics (A-5)	KU03DSCGEO202	4	
	Geography of Population and Settlement (A-6)	KU03DSCGEO203	4	
	Principles of Remote Sensing (Practical) (A-7)	KU03DSCGEO204	4	
MDC	Kerala Studies (MDC-3)		3	
VAC	VAC-1		3	
Minimum Credit Requirement for SEMESTER III			22	
SEMESTER - IV				
DSC	Climatology (A-8)	KU04DSCGEO201	4	200
	Geography of India with special reference to Kerala (A-9)	KU04DSCGEO202	4	
	Social Geography with special reference to India (A-10)	KU04DSCGEO203	4	
	Geographical Information System (Practical) (A-11)	KU04DSCGEO204	4	
SEC	(SEC-1)		3	
VAC	VAC-2		3	
Internship	Internship (Vacation)	KU04INTGEO201	2	
Minimum Credit Requirement for SEMESTER IV			24	
SEMESTER - V				
DSC	Hydrology and Oceanography (A-12)	KU05DSCGEO301	4	300
	Environmental and Biogeography (A-13)	KU05DSCGEO302	4	
	Economic Geography (A-14)	KU05DSCGEO303	4	
	Field Work and Research Methodology (Practical) (A-15)	KU05DSCGEO304	4	
DSE (Minimum 1)	World Regional Geography	KU05DSEGEO301		
	Political Geography	KU05DSEGEO302	4	
SEC	(SEC-2)		3	
Minimum Credit Requirement for SEMESTER V			23	

Course Structure: FYIMP Geography

Type	Course	Code	Credit	Level
		SEMESTER - VI		
DSC	Nature and Philosophy of Geography (A-16)	KU06DSCGEO301	4	300
	Urban Geography (A-17)	KU06DSCGEO302	4	
	Digital Image Processing (Practical) (A-18)	KU06DSCGEO303	4	
DSE (Minimum 1)	Geography of Agriculture and Food Security	KU06DSEGEO301	4	
	Geography of Tourism	KU06DSEGEO302		
SEC	(SEC-3)		3	
Internship	Internship (Vacation)	KU06INTGEO301	2	
Minimum Credit Requirement for SEMESTER VI			21	
Students exiting after 3rd Year: awarded UG Degree with Major in Geography				
Total Credit Requirement for UG Degree			133	
		SEMESTER - VII		
DSC	Spatial Dimensions of Development and Regional Planning (A-19)	KU07DSCGEO401	4	400
	Fluvial and Coastal Geomorphology (A-20)	KU07DSCGEO402	4	
	Disaster Risk Reduction based Project Work (Practical) (A-21)	KU07DSCGEO403	4	
DSE (Minimum 2)	Soil Geography	KU07DSEGEO401	4+4	
	Geo-statistics for Advanced Research	KU07DSEGEO402		
	Geography of Health and Wellbeing	KU07DSEGEO403		
	Spatial Theories	KU07DSEGEO404		
MOOC	MOOC/Online Course		4	
Minimum Credit Requirement for SEMESTER VII			24	
		SEMESTER - VIII		
DSC	Geospatial Modelling (Practical) (A22)	KU08DSCGEO401	4	400
MOOC	MOOC/Online Course		4	
Project	For Honours with Research		12	
	Research Project	KU08RGEO401		
DSC* (in lieu of Project*)	For Honours – three 4C Courses in lieu of Project*			
	Gender and Development (A-23)	KU08DSCGEO402		
	Advanced Climatology and Climate Change (A- 24)	KU08DSCGEO403		
	Water Resource Management (A-25)	KU08DSCGEO404		
Minimum Credit Requirement for SEMESTER VIII			20	
Student Exit After Four Year: Hons/Hons with Research Degree with Major in Geography				
Total Credit Requirement for Hons/Hons with Research			177	

KU01DSCGEO101 INTRODUCTION TO DYNAMIC EARTH

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
I	DSC	100-199	KU1DSCGEO101	4	60

Learning Approach (Hours/Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

In addition, this course examines the interconnectedness of Earth's systems and their influence on weather patterns, climate change, ocean currents, and ecosystems. Through case studies and real-world examples, students will analyze the environmental impacts of human activities. Thus, "Introduction to Dynamic Earth" offers a comprehensive foundation to unlock the secrets of our planet's past, present, and future. It is a foundational course designed to explore the intricate processes and phenomena that shape our planet. Through a multidisciplinary lens, this course delves into the dynamic interactions between Earth's various systems, including the lithosphere, atmosphere, hydrosphere, and biosphere. Students will explore the principles of plate tectonics, continental drift, and the geological timescale, gaining insights into the Earth's long and complex history.

Course Pre-requisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand the fundamentals of Earth system	U
2	Develop knowledge on various agents of Earth processes	A
3	Derive overview on components of earth system	An

** Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓					
CO 3						✓	

COURSE CONTENTS

Contents for Classroom Transaction :

MODULE	UNIT	DESCRIPTION	HOURS
1		**Physical Geography**	10
	1	Nature and Scope of Physical Geography	
	2	Origin and evolution of earth as a planet	
	3	Earth as a system and its components	
	4	Geological Time Scale	
2		**Lithosphere**	15
	1	Earth's interior and Isostasy	
	2	Origin of Continents and Oceans: Continental Drift and Plate Tectonics	
	3	Earth's movement: endogenic and exogenic	
	4	Landforms- plains, plateaus and mountains- types	
3		**Atmosphere**	15
	1	Composition and Structure	
	2	Energy: Insolation and Temperature	
	3	Pressure Systems and wind circulation	
	4	Precipitation	
4		**Hydrosphere**	15
	1	Hydrological cycle	
	2	Ocean Salinity and Temperature	
	3	Ocean Water Movements: Waves, Tides and Currents	
	4	Oceanic deposits	
5		**Teachers Specific**	
	Directions		5
	Illustrations based on unit 1-4		

Essential Readings:

1. Barry, R.G., and Chorley, R.J. (2010): Atmosphere, Weather and Climate, Routledge, London, 516 pp.
2. Bhattacharya, S.K. 1988. Urban Domestic Water Supply in Developing Countries, CBS Publishers, CR Distributors, Delhi.
3. Chow, V.T., Maidment, D.R. and Mays, W.L. (1988) Applied Hydrology, McGraw-Hill International Editions, McGraw-Hill Book Company, New York.
4. Chow V.T (2017) - Handbook of Applied Hydrology, Tata McGraw Hill, New Delhi
5. Jain, S.K., Aggarwal, P.K. and Singh, V.P. 2007. Hydrology and Water Resources of India, Springer, The Netherlands.
6. Byers R.H. (1974): General Meteorology, McGraw Hill BKCo New York.
7. Critchfield, H.J, (2009): General Climatology; Prentice Hall, London
8. Das P. K. (1995): The Monsoon, Prayag Pustak Bhavan, Allahabad, National Book Trust.India
9. Ela Dean, (2017); Principles of Atmospheric Science, Larsen and Keller Education, 249 pp.
10. Hobbs, J.E. (1980): Applied Climatology, Butterworth, London.
11. John E Oliver and John J Hidore 2003, Climatology – An Atmospheric Science, Pearson Education Private Limited, Delhi.
12. K Siddhartha (2018), Oceanography: A Brief Introduction, Kitab Mahal, India
13. Dennis S Hartman (1994), Global Physical Geography, Academic Press, London
14. Mysooru R Yadupathi Putty, 2020, Fundamentals of Hydrology, Wiley India.
15. Prasad Prem Kumar, 2016, Biosphere Forms and Functions, Daya Publishing House
16. Spark, B. W. (1986): Geomorphology, Longman, London.
17. Strahler, A.N (1992): Physical Geography. John Wiley & Sons Inc., New York.

Suggested Readings:

1. Thomas, M.F. (1974): Tropical Geomorphology, Macmillan, London
2. Thornbury W.D (1969) Principles of Geomorphology, Wiley Intl. Edn & Wiley Eastern Reprints 1984.
3. Wooldridge S W and R. S. Morgan (2004)–The Physical Basis of Geography - An Outline of Geomorphology, Orient Longman Private Limited.
4. Worcester, P. G. (1948): Textbook of Geomorphology.

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment	15
d)	Seminar	10
e)	Book/Article Review	

f)	Viva-Voce	10
g)	Field Report	
Total		**100**

KU02DSCGEO101 SPACE AND SOCIETY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
II	DSC	100-199	KU2DSCGEO101	4	60

Learning Approach (Hours/Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

Space and society form a symbiotic relationship that has captivated the attention of geographers. The profound interconnectedness between these entities lies at the heart of geographical inquiry, offering a nuanced lens through which human activities and social structures are examined in the context of the spaces they inhabit. The paper attempts to introduce students to understand the co-production of social structure and space in the contemporary world.

Course Pre requisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand the relationship between space and society.	U
2	To analyse population growth and its spatial pattern	An
3	In-depth understanding of social space and its construction	E
4	Understanding the geographical manifestations of culture	A

**Remember(R), Understand(U), Apply(A), Analyse (An), Evaluate(E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						

CO 2					✓		
CO 3		✓					
CO 4						✓	

COURSE CONTENTS

Contents for Classroom Transaction :

MODULE	UNIT	DESCRIPTION	HOURS
1		**Spatial Dimensions of Human Society**	10
	1	Nature and Contemporary relevance of Human Geography	
	2	Major Themes : Space (Absolute, Relative, Relational), Place, Scale, Movement, Region	
	3	Approaches in Human Geography (Positivism, Humanism, Structuralism)	
	4	Concept of Social Space and Topophilia	
2		**Population**	15
	1	World Population Distribution and Growth	
	2	Population Dynamics (Fertility, Mortality and Migration)	
	3	Demographic Transition and its Regional Pattern	
	4	Population Composition (Residence, Age, Sex)	
3		**Social Geography**	15
	1	Language	
	2	Religion	
	3	Tribes and Caste	
	4	Race and Ethnicity	
4		**Cultural Geography**	15
	1	Culture : Meaning and formation	
	2	Types of Culture, Components/Structure of Culture	
	3	Culture and Geography: Cultural Landscape	
	4	Cultural Realms of the World	
5		**Teacher Specific Module (Any one from the following)**	
	1.	Field visit to distinguish urban and rural space	5
	2.	Compiling demographic profile using census data	

Essential Readings:

1. Ahmad, Aijazuddin.(1999).Social Geography. Jaipur: Rawat Publications
2. Aitken,S.and Valentine,G(2006).Approaches to HumanGeography. Sage Publications.
3. Fouberg,E.H.,Murphy,A.B.,& De Blij,H.J.(2015).Human Geography: People, Place and Culture. John Wiley & Sons.
4. Knox,P.L.,Marston,S.A.,& Imort,M.(2016).Human Geography: Places and regions in global context. New York: Pearson.
5. Rubenstein,JamesM.(2017).TheCultural Landscape:An Introduction to Human Geography. Pearson. .

Suggested Readings:

1. Chandna,R.C.(2017).Population Geography. NewDelhi, U.S.A.: Kalyani Publishers.
2. Hassan,M.I. (2005).Population Geography.Jaipur,India : Rawat Publications.
3. Jordan-Bychkov., et al. (2006). The Human Mosaic: A ThematicIntroductiontoCulturalGeography.NewYork, U.S.A.: W. H. Freeman and Company.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment	15
d)	Seminar	
e)	Book/Article Review	
f)	Viva-Voce	10
g)	Field Report	10
	Total	**100**

KU02DSCGEO102 FUNDAMENTALS OF MAPPING (Practical)

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
II	DSC	200-299	KU02DSCGEO102	4	120

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
0	8	0	50	50	100	2

Course Description:

This course is designed to provide the knowledge and skills for understanding the process of map-making. This course covers the design, purpose, use, and proper development of maps and provides a general introduction to Cartography, broadly defined as the art, science, and ethics of map making and map use.

Course Pre-requisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand the types of maps and essentials of maps	U
2	Recognize the various methods of representing geographical data	A
3	Understand the basics of surveying techniques	U
4	Learn topographical and weather map interpretation	R

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						

CO 2					✓		
CO 3			✓				
CO 4					✓		

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Maps and its essentials**	20
	1	Maps and its types, elements of map	
	2	Co-ordinates, and their functions (demarcation of location and time calculation)	
	3	Scales: Statement, RF and Graphical and Conversion	
	4	Graphical Scale: Plain, Comparative and Diagonal	
2		**Representation of relief features**	30
	1	Quantitative: Spot height, Benchmarks, Triangulation marks, Contour	
	2	Layer tinting	
	3	Hachures	
	4	Hill Shading	
3		**Scales**	30
	1	Zenithal: Polar cases of Gnomonic, Stereographic, Orthographic, Equal Area and Equidistant	
	2	Conical: One Standard, Two Standard, Bonnes, Polyconic and International Projection	
	3	Cylindrical: Equal Area, equi-distant and Mercator	

	4	Mathematical: Sinusoidal and Molviede	
4	**Interpretation of Maps**		30
	1	Introduction to Survey of India Toposheet	
	2	Interpretation of Toposheet	
	3	Slope analysis using Wentworth Method	
	4	Interpretation of Indian Daily Weather Report	

5	**Teacher Specific Module**	
	A Project File in pencil comprising one exercise each, on relief representation techniques, scale, map projection, map interpretation.	10

Essential Readings:

1. Arthur H Robinson etal.:Elements of Cartography, John Wiley & Sons, Singapore
2. Ashish Sarkar: Practical Geography-A systematic approach, Orient Blackswan Pvt. Ltd
3. Bangulia A.M: Practical Geography,Anmol Publishers Pvt. Ltd
4. Gopal Singh: Map work and Practical Geography,Vikas Publishing Pvt .Ltd
5. Misra R.P, Ramesh A: Fundamentals of Cartography, Concept Publishing Company New Delhi
6. Monkhouse and Wilkinson: Maps and Diagrams, Metheun and Company
7. Saha P and Basu P: A Practical Geography,Books and Allied Ltd. Kolkata
8. Singh RL and Rana PB Singh, Elements of Practical Geography, Kalyani Publishers
9. Siya Ram Sharma: Practical Geography,Murali Lal & Sons Pvt .Ltd.
10. Zulfequar Ahmad Khan MD Text book of Practical Geography, Concept Publishing Company

Suggested Readings:

1. Gupta KK and Tyagi VC: Working with Map, Survey of India ,DST, NewDelhi
2. Mishra R P and Ramesh A. Fundamentals of Cartography, Concept Pub. NewDelhi
3. Robinson A H, Elements of Cartography, John Wiley and Sons, New York
4. Sarkar A. Practical Geography: A systematic Approach, Orient BlackSwan Pvt. Ltd, New Delhi

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	

c)	Project File	25
d)	Seminar	
e)	Book/Article Review	
f)	Viva-Voce	10
g)	Field Report	
Total		**100**

KU03DSCGEO201 GEOMORPHOLOGY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
III	DSC	200-299	KU03DSCGEO201	4	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description

The course Landforms Studies deals with scientific exploration of landforms, their origin and the processes that shape and reshape Earth's surface. It offers a comprehensive understanding of these natural features and dynamic forces that have shaped the planet over millions of years. By the end of the course students will gain insights into the principles, theories and methods used to analyse and interpret these natural features.

Course Pre-requisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Analyse the conceptual basis of Geomorphology	A

2	Understand the process that sculpts surface features	U
3	Examine the features of various geomorphic processes and products	E
4	Analyses the interaction between endogenic as well as exogenic processes	

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓					
CO 3			✓				
CO 4						✓	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Introduction to Geomorphology**	14
	1	Geology and Geomorphology, Nature and development of Geomorphology- branches	
	2	Scaling of landforms Land forms – classification	
	3	Origin and evolution of earth crust	
	4	Composition and structure of earth	

	Tectonic Movements	

2	1	Tectonic movements and landforms, Continental drift, Sea floor spreading, Plate tectonics	14
	2	Vulcanicity and seismicity cusses and consequences	
	3	Mountain building theories	
	4	Rocks and lithification, soil processes and properties	

3		**Gradation and landforms**	14
	1	Weathering and mass wasting	
	2	Fluvial processes and associated landforms	
	3	Underground water and Karst topography, Aeolian topography	
	4	Glacial and Periglacial topography , coastal processes and landforms	

4		**Interpreting landforms**	14
	1	Factors of landscape evolution	
	2	Views of Davis and Penk	
	3	Rejuvenation- Polycyclic landforms	
	4	Recent trends in geomorphology	

	Teacher Specific Module	
5	Prepare a file containing hand-drawn diagrams associated with major concepts, processes and landforms discussed in the module 1-4.	4
	Conduct a field visit to a river bank or coastal location to identify major erosional and depositional landforms by the denudational agent. Prepare a photo album of the landforms identified along with the descriptive notes.	

Essential Readings:

1. ArthurL.Bloom(2003)Geomorphology–AsystematicAnalysisofLateCenozoic Landforms, Pearson Education, Singapore
2. ArthurN Strahler and Alan H Strahler(1998) Modern Physical Geography,John Wiley and Sons, Inc
3. Bloom,A.L.(1991):Geomorphology,2nd Ed Englewood Cliffs, M.J. Prentice Hall
4. Chorley,R.J. Schumm,S.A.& Sugden,D.E. (1985):Geomorphology, Methuen & Co. Ltd., London, New York
5. Thornbury W.D (1969) Principles of Geomorphology,Wiley Intl.Edn &

Wiley Eastern Reprints 1984.
6. Christopherson,R.W.(1995):Elemental Geosystems A Foundationin Physical Geography, Prentice Hall Englewood Cliffs, New Jersey
7. Cook,R.U.& Doornkamp,J.C. (1974): Geomorphology in Environmental Management, An Introduction. Clarendon Press. Oxford
8. Hart,M.G.(1986):Geomorphology Pure and Applied, George Allenand Unwin, London.
9. Richard John Haggett (2003)Fundamentals of Geomorphology, Routledge, London
10. Strahler,A.N (1992) :Physical Geography. ohnWiley & Sons Inc., New York
11. VerstappenH.(1983) Applied Geomorphology, Geomorphological Surveys for Environmental Development, Elsevier, Amsterdam
12. Wooldridge SW and R.S.Morgan (2004)–The Physical Basis ofGeography-An Outline of Geomorphology, Orient Longman Private Limited

Suggested Readings:

1. Brierley,G.J. & Fryirs,K.A. (2005): Geomorphology and River Management, Blackwell Publishing, Oxford UK
2. Briggs,K.(1985):Physical Geography Process and System, Hodder and Stoughton, London
3. DayalP (1996) A Textbook of Geomorphology,Shukla Book Depot, Patna ,India
4. Fairbridge,R.W.,ed.(1968):Encyclopedia of Geomorphology Reinhold, NewYork
5. John P Miller and Luna Bergere Leopold, Fluvial Processes in Geomorphology
6. KaleVS and GuptaA (2010) Introduction to Geomorphology, Orient Longman, Calcutta
7. Leopold,L.B.Wolman,M.G.&Miller,J.P.(1964):Fluvial Processes in Geomorphology, W.H.Freeman, San Fransisco
8. Robinson,Harry (1969): Morphology and Landscape, University Tutorial Press Ltd. London
9. Spark,B.W. (1986): Geomorphology, Longman, London
10. Thomas,M.F.(1974): Tropical Geomorphology, Macmillan, London
11. Wadia,D.N.(1993):Geology of India,Tata McGraw Hill Edition, New Delhi

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment	15
d)	Seminar	10
e)	Book/Article Review	
f)	Viva-Voce	
g)	Field Report	10
Total		**100**

KU03DSCGEO202 GEOSTATISTICS

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
III	DSC	200-299	KU03DSCGEO202		4	75
Learning Approach (Hours/Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	0	50	50	100	2

Course Description:

The course would enable students to explore the principles and applications of statistical methods in spatial analysis and geographic research. It equips them with the essential skills to analyze, interpret, and visualize geographic data, providing a robust foundation for understanding spatial patterns and processes. Throughout the course, students will learn how to collect, organize, and manipulate geographic data using statistical techniques. They will delve into descriptive and inferential statistics, exploring techniques such as measures of dispersion, spatial sampling and regression analysis.

Course Pre-requisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	To know the nature of geographic data and its various sources.	R

2	To distinguish and apply descriptive and inferential statistical techniques.	U
3	Understand the advantages and disadvantages of central tendencies and dispersion.	U
4	Evaluate centrographic techniques and its application in geography.	A
5	Comprehend the science and techniques of sampling, probability and hypothesis testing.	U
6	Apply bivariate statistical analysis such as correlation and regression.	An

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2						✓	
CO 3					✓		
CO 4				✓			
CO 5					✓		
CO 6			✓				

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Statistical Methods in Geography**	10
	1	Quantitative Revolution in Geography, Significance of Statistical Methods in Geography and its limitation	
	2	Sources of Data in Geography	
	3	Geographical Data Matrix, Frequency Distribution Tables and Cross Tabulation	
	4	Scales of Measurement (Nominal, Ordinal, Interval, Ratio)	
		Descriptive Statistics	

2	1	Measures of Central Tendency (Mean, Median, Mode, Harmonic Mean and Geometric Mean)	20
	2	Measures of Dispersion (Mean deviation, Quartile Deviation, Standard Deviation, Variance, Coefficient of Variation and Lorenz Curve)	
	3	Partition Values: Quartiles, Deciles and Percentiles	
	4	Centro-graphic Techniques: Mean Centre, Median Centre, Standard Distance	
3		**Sampling, Probability and Hypothesis Testing**	15
	1	Theory of probability	
	2	Probability distribution function- Normal Distribution and Fitting of Normal Curve, Concept of Skewness and Kurtosis	
	3	Theory of Sampling and types of sampling	
	4	Testing of Hypothesis: concept of testing hypotheses, simple and composite hypotheses, null and alternative hypotheses, type I and type II errors, critical region, level of significance and power of a test, Concept of p value; Chi-square, T-test, F-test	
4		**Bivariate Analysis**	15
	1	Karl Pearson's Product Moment Correlation	
	2	Spearman's Rank Correlation	
	3	Simple Regression	
	4	Residuals from regression and its mapping	
5		**Teacher Specific Module**	15
		Preparation of Practical Record File: Teacher may circulate a data matrix of about (100 x 10) with each row representing an aerial unit (100 districts or villages) and about 10 columns of relevant attributes of the areal units like demographic variables etc. Construct frequency distribution table for at least 2 variables and calculate descriptive statistical measures for the frequency distribution table constructed. Plot mean centre and median centre. Fit Normal curve for the frequency distribution prepared based on the data matrix.	
		From the data matrix a sample set (20 Percent) would be drawn using systematic or stratified methods of sampling and locate the samples on a map with a short note on methods used. Bivariate analysis should be carried out on these randomly selected districts.	
		Each student will submit a record containing five exercises from each module.	

Essential Readings:

1. Berry B. J. L. and Marble D. F. (eds.): Spatial Analysis – A Reader in Geography.
2. Ebdon D., 1977: Statistics in Geography: A Practical Approach.

3. King L. S., 1969: Statistical Analysis in Geography, Prentice-Hall.
4. Mahmood A., 1977: Statistical Methods in Geographical Studies, Concept.
5. Pal S. K., 1998: Statistics for Geoscientists, Tata McGraw Hill, New Delhi.
6. Sarkar, A. (2013) Quantitative geography: techniques and presentations. Orient Black Swan Private Ltd., New Delhi
7. John E Freund: Mathematical Statistics (Sixth Edition), Pearson Education (India),New Delhi.

Suggested Readings:

1. Silk J., 1979: Statistical Concepts in Geography, Allen and Unwin, London.
2. Spiegel M. R.: Statistics, Schaum's Outline Series.
3. Hammond P. and McCullagh P. S., 1978: Quantitative Techniques in Geography: An Introduction, Oxford University Press.
4. V.K. Rohatgi: An introduction to Probability theory and Mathematical Statistics, Wiley Eastern.
5. Mood A.M., Graybill. F.A and Boes D.C. : Introduction to Theory of Statistics McGraw Hill

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	20
b)	Test Paper - 2	
c)	Practical Record	20
d)	Seminar	
e)	Book/Article Review	
f)	Viva-Voce	10
g)	Field Report	
Total		**100**

KU03DSCGEO203 GEOGRAPHY OF POPULATION AND SETTLEMENT

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
III	DSC	200-299	KU03DSCGEO203		4	60
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE(Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	

4	0	0	50	50	100	2

Course Description:

The course delves into the dynamic interplay between human populations and the environments they inhabit. It shows the spatial distribution and growth patterns of population in the world and factors affecting it. Students will examine the fundamental principles and theories that underpin population geography, including migration dynamics, urbanization processes, and demographic transitions. They will explore how factors such as culture, politics, economics, and technology influence population distribution and settlement patterns at various scales, from local to global.

Course Pre-requisite : NIL

Course Outcomes:

CO No	Expected Outcome	Learning Domains
1	Understand the dynamics of the population and its determinants.	R
2	Understand the implications of population composition in different regions of the world.	U
3	To know global refugee crisis	A
4	In-depth understanding about rural-urban dynamics of world population	An

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓					
CO 3							✓
CO 4			✓				

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Approaches to Population Geography**	14
	1	Nature and Scope of Population Geography; Population Geography and Demography	
	2	Sources of Population Data (Census, Vital Statistics, Samples Surveys)	
	3	Population problems & optimum population	
	4	Population resource regions	
2		**Population Dynamics**	14
	1	Population theories: Malthus, Ricardo, Marx Theory	
	2	Fertility and Mortality- Measures and Determinants	
	3	Migration- Determinants and Implications	
	4	Migration theories	
3		**Contemporary Population Issues and Policies**	14
	1	Trends and spatial dynamics of sex ratio, Dynamics of Population Pyramids and Ageing	
	2	Demographic Dividends	
	3	Population and resource conflict; Global Refugee Crisis (push and pull factors)	
	4	Population policy: World and India	
4		**Human Settlements**	14
	1	Rural Settlements: Types and Characteristics (Site, Situation, Pattern and Morphology)	
	2	Urban Settlements: Definition, Classification	
	3	Urban Morphology: Classical Models of Burgess, Hoyt, Harris and Ullman	
	4	Rural-Urban Composition of world's population	
		Teacher Specific Module	

5	Collect district level data from Census of India (minimum 10 districts). Calculate population growth rate and population pyramid.	4
	Literature review/Book review/Movie Review on the theme Global Refugee Crisis or International Migration	
	Identify examples for various settlement patterns from the toposheet/google earth images. Write a brief account on the factors affecting the location of the settlement.	

Essential Readings:

1. Beaujeu-Garnier,J. (1966) Geography of Population.London: Longman
2. Chandna,R.C. (2017).Geography of Population.Kalyani Publishers, Ludhiana,India.
3. Clarks,John,I. (1972).Population Geography.Pergamon Press,New York.
4. HassanM.I. (2020).Population Geography, A Systematic Exposition. Routledge Taylor and Francis Group, New York.
5. Lutz, W., Warren, C. S. and Scherbov, S. (2004). The End of the World Population Growth in the 21st Century. UK: Earthscan.
6. Majumdar,P.K.(2010).Fundamentals of Demography. Rawat Publications, Jaipur.
7. Newbold,K.B.(2017).Population Geography: Tools and Issues. Rowman and Littlefield Publishers, NY, USA

Suggested Readings:

1. Clarke,J.I.(2003).Population Geography. Oxford: Pergamon Press.
2. Hudson,F.S.(2013).A Geography of Settlement. Plymouth: Macdonald & Evansltd.
3. Ghosh,S.(2002).A Geography of Settlement .Kolkatta: Orient Longman.
4. Jones,H.R.(2000).Population Geography.London: Paul Chappman.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment	15
d)	Seminar	
e)	Book/Article Review	10
f)	Viva-Voce	10
g)	Field Report	
Total		**100**

KU03DSCGEO204 PRINCIPLES OF REMOTE SENSING (Practical)

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
III	DSC	200-299	KU03DSCGEO204		4	120
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
0	8	0	50	50	100	2

Course Description:

The course is designed to introduce students to the fundamental concepts and applications of remote sensing technology. This course emphasizes hands-on experience, providing students with the skills needed to acquire, analyze, and interpret remote sensing data. Through practical exercises and projects, students will learn how to apply remote sensing techniques in various fields such as environmental monitoring, agriculture, urban planning, and disaster management.

Course Prerequisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	To create a basic knowledge on different types of remote sensing, basic principles of remote sensing	U
2	To make the students aware about the significance of the applications of remote sensing as a tool for monitoring objects & phenomena and suggesting their strategic management.	A
3	Examine the recent trends in RS technology and its application in various fields of research.	An
4	To apply the potentials of remote sensing technology in multidisciplinary research and to make suggestions for various problems	E

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E),Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						

CO 2		✓		✓			
CO 3			✓	✓			✓
CO 4						✓	✓

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Principles of Remote Sensing**	20
	1	Evolution of Remote Sensing, Process of remote Sensing,	
	2	Advances in Indian remote sensing	
	3	Electromagnetic Radiation, EMS, Energy Interactions with Atmosphere.	
	4	Energy Interactions with Earth Surface Features- Spectral Reflectance of Earth Surface Feature Types	
2		**Photogrammetry**	30
	1	Development of Aerial remote Sensing, Basic Principles of Photogrammetry - Flight Planning Mission	
	2	Aerial Photographs: types and characteristics; Stereoscope	
	3	Orientation of Areial Photograph; Scale Determination	
	4	Elements of visual interpretation of aerial photo; Image parallax	
3		**Principles of Satellite remote sensing**	30
	1	LANDSAT, SPOT, IRS, ERS, INSAT programmes and their characteristics.	
	2	Types of satellites and sensors, Platforms / Sensor properties	
	3	Multispectral and Hyperspectral Remote Sensing, Thermal and micro wave Remote Sensing.	
	4	Data products- Geometric Characteristics.	

<table>
<tr><td rowspan="5">4</td><td colspan="2">Principles of Image Interpretation</td><td rowspan="5">30</td></tr>
<tr><td>1</td><td>Basic Principles of Visual Interpretation of Satellite Image</td></tr>
<tr><td>2</td><td>Digital Image Processing, Procedures in Digital Image Processing, Data Pre-processing, Ground Truth verification.</td></tr>
<tr><td>3</td><td>Image Classification- Supervised and Unsupervised Classification, Accuracy Assessment</td></tr>
<tr><td>4</td><td>Clipping and map outlay setting</td></tr>
<tr><td rowspan="2">5</td><td colspan="2">Teacher Specific Module</td><td></td></tr>
<tr><td colspan="2">Directions</td><td></td></tr>
<tr><td></td><td colspan="2">Prepare Practical Record File containing at least 5 exercises from the following:
1. Practical 1: Calculation of Scale of Aerial Photograph (Using following methods: Focal Length and Flying Height of the Aircraft, Using Photo Distance and Ground Distance, Using Photo Distance and Map Distance).
2. Practical 2: Orientation of Aerial Photo using available Stereoscope (Mirror or Pocket Stereoscope).
3. Practical 3: Identification, Image Interpretation Key and interpretation of Feature Types in Aerial Photographs using a stereoscope.
4. Practical 4: Downloading various remote sensing data (Bhuvan and Landsat data). Preparation of spectral signatures curves for different Various Feature Types (LU/LC) types (only four: Water body, Vegetation, Open/fallow land and built up).
5. Practical 5: Clip, merge, band stacking / virtual raster.
6. Practical 6: Satellite Image Classification Using Unsupervised Methods and Preparation of Land Use/Land Cover Map Using Bhuvan or Landsat Data.</td><td>10</td></tr>
</table>

Essential Readings:

1. James B Campbell and Randolph H W (2011) Introduction to Remote Sensing, Gulford Press, New York.
2. Basudeb Bhatta (2008) Remote Sensing and GIS, OUP India Publication.
3. Christian Matzler (2006) Thermal microwave radiation: Applications for remote sensing, The Institution of Engineering and Technology, London.
4. Lillesand T M, Kiefer R W and J W Chipman (2008) Remote sensing and

Image Interpretation, John Wiley, New Delhi.
5. Christian Matzler (2006) Thermal microwave radiation: Applications for remote sensing, The Institution of Engineering and Technology, London.

Suggested Readings:

1. Remote Sensing and Environment, Elsevier Publication
2. Journal of Geodesy, Springer Publication.
3. IEEE Transactions on Geoscience and Remote Sensing, Institute of Electrical and Electronics Engineers Inc.
4. Remote Sensing in Ecology and Conservation, Zoological society of London, Online ISSN:2056-3485
5. Sailesh Samanta, A Text Book of Remotesensing , GIS and GNSS, Nation press Publication.

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper- 1	15
b)	Test Paper-2	
c)	Practical Record File	25
d)	Seminar	
e)	Book/ Article Review	
f)	Viva-Voce	10
g)	Field Report	
Total		**100**

KU04DSCGEO201 CLIMATOLOGY

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
IV	DSC	200-299	KU04DSCGEO201		4	60
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE(Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

The course on Climatology offers a comprehensive exploration of Earth's atmospheric system, focusing on their dynamic interactions and influence on the global climate. The

syllabus encompasses a broad range of topics, including atmospheric circulation patterns, climate zones, climate change, and the impact of human activities on the environment. Through a combination of theoretical lectures, practical lab sessions and fieldwork, students gain a deep understanding of climate processes and their intricate relationship with the Earth's ecosystems. Moreover, the course equips students with essential analytical and research skills, enabling them to assess climate data, develop climate models, and propose effective strategies for climate adaptation and mitigation.

Course Prerequisite: NIL

Course Outcomes:

CO No	Expected Outcome	Learning Domains
1	Understand the mechanism of climatic phenomena.	U
2	Understand the extreme weather phenomena, their occurrence, and its impact.	An
3	Classification of climate & analysis of climatic data, their interpretation and weather forecasts.	A

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓					
CO 3					✓		
CO 4	✓						
CO 5						✓	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Introduction to Climatology**	12
	1	Nature and Scope of Climatology; Climatology and Meteorology	
	2	Weather and Climate, Elements and controls of climate	
	3	Insolation and Controlling factors, Heat Budget	
	4	Atmospheric temperature- Horizontal distribution and factors affecting; Vertical distribution- Normal lapse rate and Inversion of temperature	
2		**Atmospheric System**	14
	1	Atmospheric Pressure- Horizontal Distribution– Coriolis force; Major pressure belts; Vertical Distribution	
	2	Planetary Wind System and Local Wind System	
	3	Atmospheric disturbances: cyclones (Tropical and Extra-Tropical), anti-cyclones	
	4	Air masses and Fronts	
3			14
	1	Water in the atmosphere: Atmospheric humidity and its types	
	2	Condensation: Dew, Fog and Clouds- Classification	
	3	Stability and cloud development	
	4	Precipitation: Types and Distribution	
4		**Climatic Regions and Classification**	10
	1	Climate classification- Introduction	
	2	The Ancient Greek	
	3	The Koppen System	
	4	Thornthwaite System	

	Teacher Specific Module	
5	*Directions* Climate data sources; Weather instruments: data acquisition and dissemination Graphs and Diagrams-Columnar, Linear, and Circular graphs– Frequency Graphs – Trend graphs Windrose diagrams- Stardiagram, Octagonal diagram, Compound wind roses; Hythergraph, Climograph, Climatograph Preparation of climatic maps- Isopleths, Isotherms, Isobars, Isohytes, Equipluves, and Equi-Variable maps Practical Record File comprising one exercise each from the above mentioned list should be prepared.	10

Essential Readings:

1. Critchfield, HowardJ(2008):General Climatology, Prentice Hall, London
2. Barry,R.G.,andChorley,R.J.(2010):Atmosphere,Weather andC limate,Routledge,London
3. Oliver,JohnE & Hidore, JohnJ (2001):Climatology-Anatmospheri cscience,Pearson Education
4. Singh,Savindra(2020):Climatology, Pravallika publications, Allahabad
5. Sidhartha,K(2016):Atmosphere,Weather and Climate, Kisalaya Publications Private Limited, Delhi
6. Lal D S (2003):Climatology, Sharda Pustak Bhavan, Allahabad.
7. Ashish Sarkar(2009) Practical Geography–A systematic approach,Orient Black Swan, Kolkata.
8. Saha,Pijushkanti(2017) Advanced Practical Cartography,Books and Allied,Kolkata
9. Singh L R (2009) Fundamentals of Practical Geography, Sharda Pustak Bhavan
10. Singh RL and Rana B Singh(2004) Elements of Practical Geography, Kalyani Publishers, New Delhi
11. Robinson,P.J.and Sellers,H. (1986),Contemporary Climatology, Longman, London.

Suggested Readings:

1. Negi,B.S (2000):Climatology and Oceanography, Kedar Nathram Nath publishers, Meerut
2. Trewartha, G.T. (Latest edition) Introduction to Climate, McGraw Hill, New York.
3. Mayes and Hughes (2004):Understanding weather-a visual approach, Arnold publishers
4. Lutgens, Frederick K et.al (2018):The Atmosphere-An Introduction to Meteorology, Prentice Hall India, New Delhi
5. Strahler,A.H.and Strahler,AN.,(2001) Modern Physical Geography(4/E), JohnWiley and Sons, Inc., New York
6. https://worldoceanreview.com/en/wor-1/climate-system/great-ocean-currents/
7. Bulletin of the American Meteorological Society (https://journals. ametsoc.org/toc/bams/ current)
8. Climate Dynamics (https://link.springer.com/journal/volumes And Issues/382)
9. International Journal of Climatology(https://rmets.onlinelibrary.wiley.com/journal/10970088) Journal of

Climate (https://journals.ametsoc.org/toc/clim/current)

10. Nature Climate Change (https://www.nature.com/nclimate/)
11. Weather and Climate Extremes (https://www.sciencedirect.com/journal/weather-and- climate-extremes)

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Practical Record File	20
d)	Seminar	
e)	Book/Article Review	
f)	Viva-Voce	15
g)	Field Report	
Total		**100**

KU04DSCGEO202 GEOGRAPHY OF INDIA WITH SPECIAL REFERENCE TO KERALA

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
IV	DSC	200-299	KU04DSCGEO202		4	60
Learning Approach (Hours/Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	ESE	CE	Total	
4	0	0	50	50	100	2

Course Description:

The course offers a comprehensive exploration of the geographical landscape of India, with a focused lens on the vibrant state of Kerala. Through a blend of theoretical concepts, case studies, and practical applications, students will delve into the diverse physical, cultural, and socio- economic aspects that shape the geography of both India and Kerala. Thus, the course enable students in gaining nuanced understanding of the geography of India, with a particular focus on Kerala, and its implications for various aspects of human life and development.

Course Pre-requisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand a comprehensive idea about physical structure of India	U
2	Create a general awareness of socio- cultural diversity and resource utilization of country.	An
3	Analyze the physical setting of Kerala and its influence on socio-cultural fabric.	A
4	Critical Examination of the state of Kerala's economy & Development	E

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓					
CO 3	✓						
CO 4						✓	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS

1	**Physical Settings**		14
	1	Geo-political Significance of Location of India and its boundary	
	2	Physiographic divisions and major features; Soil and natural vegetation	
	3	Drainage Systems and Pattern: Himalayan and Peninsular River system	
	4	Climate- Factors influencing Indian climate; classification; Indian Monsoon	
	People		
2	1	Population: Density, Distribution and Growth	14
	2	Population Composition: Rural and Urban; Age and Sex	
	3	Social Composition: Language, Religion, Caste and Tribes	
	4	Population Problem and Policies	
3	**Resources and Economy**		14
	1	Major mineral resources of India	
	2	Distribution and utilization of major resources	
	3	Agriculture: production and distribution of major crops	
	4	Industrial Development: Automobile and Information Technology; major industrial belts	
4	**Kerala**		14
	1	Physical Setting: Location, Physiographic Division, Climate, Drainage Systems, Soil and Vegetation	
	2	Demography: Density and Growth of Population; Literacy, Sex- Ratio and Rural-Urban Composition; Caste, Tribes and Religion and its spatial dimensions	
	3	Economy: Agriculture; Distribution of major resources; Major Industries; Tourism	
	4	Kerala Model of Development	
5	**Teacher Specific Module**		
	Direction		
	Prepare handmade atlas with following plates: 1. Physiographic divisions of India 2. Drainage 3. Soil and Vegetation 4. Distribution of population 5. Population composition- Rural-Urban; Sex Ratio, Religion 6. Resources		4
	Book review exercise		

Essential Readings:

1. Husain. (2012). *Geography Of India*. McGraw-Hill Education (India) Pvt Limited.
2. Khullar, D. R. (n.d.). *Geography Textbook*. New Saraswati House India Pvt Ltd.
3. Chattopadhyay, S. 2017. Geomorphological Field Guide Book on Laterites and Backwaters of Kerala (Edited by AmalKar). Indian Institute of Geomorphologists, Allahabad
4. Ranjan, A. (2023). *Federalism and Inter-State River Water Disputes in India*. Taylor & Francis.
5. Sadasivan, S. N. (2003). *River Disputes in India: Kerala Rivers Under Siege*. Mittal Publications.
6. Deb, M., & Sarkar, S. C. (2017). *Minerals and Allied Natural Resources and their Sustainable Development: Principles, Perspectives with Emphasis on the Indian Scenario*. Springer.
7. State of Environment Report Kerala, (2007). Land environments, Wetlands of Kerala and Environmental Health. Vol I.
8. State Planning Board, Thiruvananthapuram (2017). Economic Review.
9. Government of Kerala. Urban Policy and Action Plan for Kerala. Available from http://www.kerala.gov.in/annualprofile/urban.htm.

Suggested Readings:

1. Holland, S. T. H., & India, G. S. of. (2023). Sketch Of The Mineral Resources Of India. LEGARE STREET Press.
2. Valdiya, K. S. (2001). Himalaya: Emergence and Evolution. Universities Press.
3. Agarwala, S. N. (1975). India's Population: Some Problems in Perspective Planning: Proceedings. Bloomsbury Academic.
4. Anjali, G., Tridib, C., J, M., Anindyo, & Shibashis (eds), C. (2009). India's Foreign Policy. Pearson Education India.
5. Cassen, R. (1978). India: Population, Economy, Society. Macmillan.
6. Ancient Communities of the Himalaya—Google Books. (n.d.). Retrieved February 1, 2024, from https://www.google.co.in/books/edition/Ancient_Communities_of_the_Himalaya/tK5y4iPArKQC?hl=en&gbpv=0
7. Gulia, K. S. (2007). Discovering Himalaya: Tourism Of Himalayan Region (2 Vols.). Gyan Publishing House.
8. Indian Minerals Yearbook. (2006). Indian Bureau of Mines.
9. India's Foreign Policy. (n.d.). Drishti IAS. Retrieved February 1, 2024, from https://www.drishtiias.com/daily-updates/daily-news-editorials/india-s-foreign-policy- 1
10. Life in the Himalaya—Google Books. (n.d.). Retrieved February 1, 2024, from https://www.google.co.in/books/edition/Life_in_the_Himalaya/E5EmDwAAQBAJ?hl=en&gbpv=0

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment	20
d)	Seminar	
e)	Book/Article Review	15

f)	Viva-Voce	
g)	Field Report	
Total		**100**

KU04DSCGEO203 SOCIAL GEOGRAPHY WITH SPECIAL REFERENCE TO INDIA

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
IV	DSC	200-299	KU04DSCGEO203		4	60
Learning Approach (Hours/Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	ESE	CE	Total	
4	0	0	50	50	100	2

Course Description:

This course explores the intricate relationship between society and space, focusing on the spatial dimensions of social structures, identities, and inequalities. It provides an in-depth understanding of key concepts in social geography, emphasizing how social processes shape and are shaped by geographical contexts. The course examines the geographic basis of socio-cultural regionalization in India, highlighting the interplay of caste, religion, ethnicity, gender, and economic disparities in shaping the social landscape. Additionally, it delves into the dimensions of social well-being, accessibility to resources, and the geographies of inclusion and exclusion. Through case studies and critical analysis, students will engage with contemporary social issues in India, gaining a comprehensive perspective on the spatial patterns of social change and development.

Course Pre-requisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	To acquaint the students to the key concepts in social geography.	U

2	Knowledge of the geographic basis of socio-cultural regionalisation in India.	An
3	Analyze the dimensions of social wellbeing.	A
4	Evaluate geographies of inclusion and exclusion.	E

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓					
CO 3	✓						
CO 4						✓	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Situating Social Geographies**	14
	1	Origin, Nature and Scope of Social Geography	
	2	Approaches and Methodologies	
	3	Concept of Social Space	
	4	Social Geography as an academic discipline in India	
		Historical Bases of Socio cultural regionalization of India	
2	1	Peopling in India: role of centripetal and centrifugal forces; Aryavarta, Dakshinpatha, Narmada Chota-Nagpur axis, regional identities and regionalism	14
	2	Historically evolved regional structure duirng mahajanpadas and mughal subahs	

	3	Inversion of regional structure in colonial period, Implications of emerging regional structure since independence	
	4	Socio- Cultural Regions	
3	**Social Wellbeing**		14
	1	Concept of Social Well Being; Needs and Wants	
	2	Components of Social Well Being: Healthcare, Education	
	3	Components of Social Well Being: Housing	
	4	Gender Equality in India	
4	**Social Geographies of Inclusion and Exclusion**		14
	1	Caste, ethnicity, race, religion based social and spatial exclusion	
	2	Slums and Gated Communities	
	3	Communal Conflicts and Crime	
	4	Disability and Space	
5	**Teacher Specific Module**		
	Direction		
	Assignment on specific region with regard to: • tracing elements of regionalization and sub regionalization • caste regions and caste driven settlement morphology • mapping access to health, education and housing		4
	Book review exercise		

Essential Readings:

1. Ahmed, A. 1999. Social Geography, Rawat publications, Jaipur.
2. Singh, K.S. 1993. People of India Vol I to XI, Oxford University Press, New Delhi.
3. Raza, M. and Ahmed, A. 1990. An Atlas of Tribal India, Concept Publishing Co, Delhi.
4. Sopher, D. (ed.) 1980. An Exploration of India: Geographical Perspectives on Society and Culture, Cornell Press, New York.
5. Crane Robert, I. 1973. Regions and Regionalism in South Asian Studies: An Exploratory Study, Duke University Durham.
6. Pannikar, K.M. 1959. Geographical Factors in Indian Histor, Bharatiya Vidya Bhavan, Bombay.
7. Subba Rao, B. 1958. Personality of India, MS University Press, Baroda.

Suggested Readings:

1. Ahmed, A. 1993. (ed) Social Structure and Regional Development: A Social Geography Perspective, Rawat Publications, Jaipur.
2. Schwartzberg, J. 1978. A Historical Atlas of South Asia, University of Chicago Press, Chicago.
3. Chris Hamnett (1966) – Social Geography A Reader, Taylor and Francis Ltd
4. David M. Smith (1973) The Geography of Social Well-Being in the United States: An Introduction to Territorial Social Indicators, McGraw-Hill, New York.
5. Johns E (Ed.) (1975) – Readings in Social Geography, Oxford University Press
6. Paul Knox (1975) Social Wellbeing, A Spatial Perspective, Oxford University Press.
7. Ali S.M (1966) The Geography of Puranas, Peoples Publishing House, New Delhi.

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment	20
d)	Seminar	
e)	Book/Article Review	15
f)	Viva-Voce	
g)	Field Report	
Total		**100**

KU04DSCGEO204 : GEOGRAPHICAL INFORMATION SYSTEM (Practical)

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
IV	DSC	200-299	KU04DSCGEO204		4	120
Learning Approach (Hours/Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
0	8	0	50	50	100	2

Course Description:

The Geographic Information System (GIS) Practical course aims to equip students with hands-on experience in using GIS software for spatial data analysis, mapping, and visualization. Students will learn practical skills in data manipulation, geo processing, and spatial analysis through laboratory exercises, projects, and case studies. The course covers a range of GIS applications in various domains such as urban planning, environmental management, agriculture, and disaster response. By the end of the course, students will be proficient in utilizing GIS tools and techniques to solve real- world spatial problems.

Course Pre requisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains

1	Understand the basic principles and concepts of Geographic Information System (GIS).	U
2	Acquire, preprocess, and manage spatial data from various sources.	A
3	Perform spatial analysis tasks such as proximity analysis, spatial querying, and surface analysis using GIS software.	An
4	Create thematic maps, perform spatial interpolation, and visualize spatial data effectively.	C
5	Integrate and manipulate spatial datasets for decision-making and planning purposes	E
6	Design and implement GIS-based projects to address real-world spatial problems	C
7	Communicate spatial analysis findings effectively through maps, reports, and presentations	A

**RememberIng (R), Understand(U), Apply(A), Analyse(An), EvaluateI, Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2				✓			
CO 3				✓			
CO 4					✓		
CO 5			✓				
CO 6						✓	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Introduction to GIS**	20
	1	Introduction to GIS: Concepts and Applications	
	2	Components of GIS: Hardware, Software, Data, and People	
	3	Spatial Data Types and Formats	
	4	Coordinate Systems and Map Projections	
2		**Spatial Data Handling and Analysis**	30
	1	Spatial Data Acquisition Techniques: GPS, Remote Sensing	
	2	Data Preprocessing and Cleaning	

	3	Spatial Analysis Techniques: Buffering, Overlay, and Interpolation	
	4	Geo processing Tools and Functions in GIS	
	Advanced Spatial Analysis		
3	1	Advanced Spatial Analysis Techniques: Network Analysis, 3D Analysis	30
	2	Spatial Statistics and Modeling	
	3	Web GIS and Mobile GIS Applications	
	4	Case Studies and Practical Applications	
4	**Project-based Learning in GIS**		30
	1	Designing and Planning GIS Projects	
	2	Data Collection and Integration for Project Implementation	
	3	Analysis, Interpretation, and Presentation of Project Results	
	4	Real-world Applications and Case Studies	
5	**Teacher Specific Module**		
	Directions		
	Prepare a project file using the applications of GIS Software. The project may be designed on any of the following topic, if not limited to them: Land Use / Land Cover Change, Urban Studies, Environmental Hazards, resource mapping and management etc.		10

Essential Readings:

1. Fundamentals of Geographical Information Systems" by P. C. K. Mishra
2. "GIS Applications in Agriculture" by S. R. Pal and S. K. Ghosh
3. "Geographic Information Systems: An Introduction" by Mahesh Rao and Shashi Shekhar
4. "GIS and Remote Sensing: Principles and Applications" by Mohammed A. Kalkhan
5. "Geoinformatics: Principles, Applications, and Emerging Trends" by Prashant K. Srivastava and Lipi Das
6. "Introduction to GIS and Remote Sensing" by A. V. Senthil Kumar and C. V. Raja
7. "Practical Manual on GIS and Remote Sensing" by N. Thirunavukkarasu and V. R. Rajan
8. "Geospatial Technology for Digital Soil Mapping" by A. B. Panigrahy, S. K. Swain, and P. K. Srivastava
9. "Practical Manual on Geoinformatics" by R. R. Yadav and S. K. Srivastava
10. "Geographical Information System and Global Positioning System" by P. C. K. Mishra
11. "Remote Sensing and GIS: Principles and Applications" by P. C. K. Mishra and O. P. Mathur
12. "GIS for Environmental Applications: A Practical Approach" by X. Wang and V. P. Singh
13. "Geoinformatics: Theory and Practice" by K. S. Rajan and K. C. Tiwari
14. "Advanced Techniques in Geographic Information Systems" by P. R. Ahuja and K. P. K. Nair
15. "GIS and Remote Sensing: Principles and Applications" by Mohammed A. Kalkhan
16. "Advanced Geospatial Analysis: Theory and Applications" by K. C. Tiwari and K. S. Rajan
17. "Practical Applications of Geospatial Technology" by S. K. Swain, A. B. Panigrahy, and P. K. Srivastava

18. "Advanced Remote Sensing: Digital Image Processing and Applications" by P. C. K. Mishra
19. "Spatial Analysis and Modeling in Geographical Transformation Process" by P. L. N. Raju
20. "Spatial Data Analysis in Urban and Regional Planning" by A. K. Singh and O. P. Mathur
21. "Advanced Geographical Information Systems and Web Technologies" by B. P. Prakash
22. "Spatial Data Mining and Geographic Knowledge Discovery" by M. Anji Reddy
23. "Advanced Spatial Statistics: Geostatistics, Spatial Regression, and Spatial Econometrics" by G. S. Srinivasan and K. R. Prasad.

Suggested Readings:

1. Fundamentals of Geographical Information Systems" by P. C. K. Mishra
2. "GIS Applications in Agriculture" by S. R. Pal and S. K. Ghosh
3. "Geographic Information Systems: An Introduction" by Mahesh Rao and Shashi Shekhar
4. "GIS and Remote Sensing: Principles and Applications" by Mohammed A. Kalkhan
5. "Geoinformatics: Principles, Applications, and Emerging Trends" by Prashant K. Srivastava and Lipi Das
6. "Introduction to GIS and Remote Sensing" by A. V. Senthil Kumar and C. V. Raja
7. "Practical Manual on GIS and Remote Sensing" by N. Thirunavukkarasu and V. R. Rajan
8. "Geospatial Technology for Digital Soil Mapping" by A. B. Panigrahy, S. K. Swain, and P. K. Srivastava
9. "Practical Manual on Geoinformatics" by R. R. Yadav and S. K. Srivastava
10. "Geographical Information System and Global Positioning System" by P. C. K. Mishra
11. "Remote Sensing and GIS: Principles and Applications" by P. C. K. Mishra and O. P. Mathur
12. "GIS for Environmental Applications: A Practical Approach" by X. Wang and V. P. Singh
13. "Geoinformatics: Theory and Practice" by K. S. Rajan and K. C. Tiwari
14. "Advanced Techniques in Geographic Information Systems" by P. R. Ahuja and K. P. K. Nair
15. "GIS and Remote Sensing: Principles and Applications" by Mohammed A. Kalkhan
16. "Advanced Geospatial Analysis: Theory and Applications" by K. C. Tiwari and K. S. Rajan

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Practical File	25
d)	Seminar	
e)	Book/Article Review	
f)	Viva-Voce	10
g)	Field Report	
Total		**100**

KU05DSCGEO301 HYDROLOGY AND OCEANOGRAPHY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
V	DSC	300-399	KU05DSCGEO301	4	60

Learning Approach (Hours/Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

This course delves into the intricate relationship between water and soil systems, exploring the fundamental principles of hydrology and soil science. Through a blend of theoretical study and hands-on exercises, students will gain a comprehensive understanding of the dynamic processes that govern water movement, distribution, and quality within terrestrial ecosystems, as well as the critical role soil plays in these processes.

Course Prerequisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand basic concepts of hydrological regime.	U
2	Analyze and explain various components of water balance and management of river basins.	An
3	Understand and evaluate best practices of integrated watershed management.	E
4	Identify different types of soil, distribution and management of soil resources.	U

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓	✓					
CO 2	✓	✓					
CO 3			✓			✓	
CO 4	✓					✓	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Hydrology and Water Balance**	14
	1	Nature and scope of Hydrology; Branches and approaches in Hydrology	
	2	Hydrological cycle: precipitation, interception, evaporation, evapo-transpiration, infiltration, percolation, run-off and over land flow, ground water-table, flow of water in aquifers	
	3	Properties of Water, Concept of Water Balance, Inter- relationships between components of water balance	
	4	Water balance equation, concept of potential and actual evapotranspiration, soil moisture storage, water deficit and water surplus	
2		**Water Resources**	14
	1	Formation of surface water resources: streams, rivers, lakes and swamps	
	2	Characteristics of river basins: basin parameters, river network, discharge, runoff, inter-flow and base-flow; delineation of drainage basin	
	3	Ground-water: aquifer, water table, subsurface flow- concept of infiltration and factors affecting infiltration.	
	4	Porosity and permeability, Zone of aeration and saturation, types and properties of aquifers, Principles of groundwater flow, Recharge of ground water	
		Ocean Systems	
	1	Relief of the ocean floor	
3	2	Temperature and Salinity of the oceans– Horizontal and Vertical Distribution	14
	3	Ocean Movements- Capillary Waves, Sea Swells, Storm Surge, Tides and Tsunami	
	4	Currents: Major currents of the Indian, Pacific & Atlantic Ocean & Counter Currents; Elnino and LaNina	
4		**Marine Resource**	14
	1	Oceanic Deposits: Terrigenous and Pelagic Deposits	
	2	Coral reefs – formation and types - Barrier reef, Atoll, Fringing Reef & coral islands	
	3	Threats to marine environment: Oil spill-over, over fishing, sea level rise	
	4	Ocean resources and international cooperation	
		Teacher Specific Module	
		Workshop on water resource assessment, management and conservation.	
		Calculation of water balance for selected location.	

5	Conduct field survey and prepare beach profile. Illustration of ocean currents of India, Pacific and Atlantic Ocean.	4

Essential Readings :

1. Andrew. D.W., and Stanley, T. (2004). Environmental Hydrology, 2nd edition. USA: Lewis Publishers, CRC Press.
2. Fetter, C.W. (2005). Applied Hydrogeology. New Delhi, India: CBS Publishers & Distributors.
3. Karanth, K.R. (1988). Ground Water: Exploration, Assessment and Development. New Delhi, India:- Tata- McGraw Hill.
4. Lyon, J.G. (2003). GIS for Water Resource and Watershed Management, NY, USA: Taylor and Francis.
5. Singh, M., Singh, R.B., and Hassan, M.I. (Eds.) (2014): Landscape ecology and water management, Proceedings of IGU Rohtak Conference, Volume 2. Advances in Geographical and Environmental Studies, Springer.
6. Strahler A. and Strahler A. (2008). Physical Geography: Science and Systems of the Physical Environment. New York , USA: John Wiley & Sons.
7. Sidhartha,K (2014): Oceanography-A brief introduction ,Kisalaya Publications, Private Limited, Delhi

Suggested Readings:

1. Rao, K.L. (1982). India's Water Wealth,2nd edition. Delhi, India: Orient Longman.
2. Reddy, K. Ramamohan, VenkateswaraRao,B, Sarala, C. (2014). Hydrology and Watershed Management. India: Allied Publishers.
3. Singh, V. P. (1995). Environmental Hydrology. The Netherlands: Kluwar Academic Publications.
4. Tideman, E.M. (1999). Watershed management - Guidelines for Indian Conditions. Delhi, India: Omega Scientific Publishers.
5. Todd, D.K. (1959). Ground water Hydrology. New Delhi, India: Wiley India Edition.
6. https://www.noaa.gov/education/resource-collections/ocean-coasts/ocean-currents
7. https://worldoceanreview.com/en/wor-1/climate-system/great-ocean-currents/

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	10
b)	Test Paper - 2	
c)	Assignment/Practical work outlined in Module 5	15
d)	Seminar	15
e)	Book/Article Review	
f)	Viva-Voce	10
g)	Field Report	
Total		**100**

KU05DSCGEO302 ENVIRONMENTAL AND BIOGEOGRAPHY

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
V	DSC	300-399	KU05DSCGEO302		4	60
Learning Approach (Hours/Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

Environmental and Biogeography provides a comprehensive foundation to navigate the dynamic interface between living organisms and their environment. This course integrates principles from ecology, climatology, and biogeography to elucidate the dynamic interactions shaping ecosystems and biodiversity patterns. Students will delve into the fundamental principles of ecology, examining the flow of energy and matter through ecosystems and the intricate web of interactions between organisms and their environment. In the realm of biogeography, students will explore the spatial patterns of biodiversity and the processes that shape them. The course will enable students to understand how factors such as climate, topography, and human activities influence biodiversity patterns and ecosystem dynamics across different spatial scales. This course delves into the pressing environmental challenges facing our planet, including habitat destruction, climate change, and species extinction. Students will critically evaluate strategies for conservation, sustainable resource management, and the restoration of degraded ecosystems, fostering an understanding of the complexities of environmental stewardship.

Course Prerequisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Detailed exposure of ecosystem and its geographical dimensions.	R
2	Appreciate the functionality of the bio geographical processes and biogeochemical cycles.	U
3	In-depth knowledge of human adaptation in various biomes.	A
4	Understand the factors affecting its distribution of flora and fauna and major environmental issues.	An
5	Critically evaluate the global and national level efforts to conserve biodiversity.	E

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1		✓					
CO 2	✓						
CO 3	✓						
CO 4			✓				
CO 5						✓	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Ecosystem**	14
	1	Human-Environment Relationships: Historical Progression, Environment, Ecology and Ecosystem	
	2	Ecosystem: Concept, Structure and Functions	
	3	Introduction to Environmental Geography	
2		**Biogeographical Processes and Biogeochemical Cycles**	14
	1	Dispersal and Speciation; Ecological Succession and Extinction	
	2	Biogeochemical cycles	
	3	Factors influencing global distribution: Phyto-geographical realms and Zoogeographical realms	
3		**Human Environment Relationship and Contemporary Environmental Problems**	14
	1	Human life in different environmental regions: Mountain, desert, coastal	
	2	Major environmental issues in the world and India: Climate change, biodiversity loss, Pollution	
	3	Environmental movements in India: Western Ghat Conservation, Chipko Movement, Narmada Bachao Andolan	
		Biogeography	
	1	Definition, scope and significance of Biogeography; Basic Ecological Principles and Darwin's theory of Evolution	

4	2	Ecotone and ecological niche, Concepts of Biome, distribution of flora and fauna	14
	3	Bio-diversity- concept, Types, problems, Conservation measures; Biodiversity Hotspots in India	
5	**Teacher Specific Module**		
	Group wise documentary making on the theme 'Documenting Local Biodiversity and its Conservation'		4

Essential Readings:

1. Chandna R. C., 2002: Environmental Geography, Kalyani, Ludhiana.
2. Cunninghum W. P. and Cunninghum M. A., 2004: Principals of EnvironmentalScience: Inquiry andApplications, Tata Macgraw Hill, New Delhi.
3. Goudie A., 2001: The Nature of the Environment, Blackwell, Oxford.
4. Odum, E. P. et al, 2005: Fundamentals of Ecology, Ceneage Learning India.
5. Huggett, R.J. (1998). Fundamentals of Biogeography, USA: Routeldge
6. Lomolino, Mark. V., 2020, Biogeography: A Very Short Introduction,Oxford Publication, ISBN: 9780198850069
7. Cox, C.B, et.al, 2016, Biogeography: An Ecological and Evolutionary Approach, 9th Edition, Wiley-Blackwell.
8. Taylor, J.A., 2021, Themes in Biogeography, Routledge, Taylor andFrancis publications, ISBN 9780367351106

Suggested Readings:

1. MoEF, 2006: National Environmental Policy-2006, Ministry of Environment and Forests, Government of India.
2. Pielou, E.C., 1979, Biogeography, John Wiley & Sons, USA.10: 0471058459ISBN 13: 9780471058458
3. L.C Aggarwal, 2018, Biogeography, Rawat publication Jaipur
4. Mathur, H.S. (1998). Essentials of Biogeography. Jaipur, India: Anuj Printers.
5. Singh S., 1997: Environmental Geography, Prayag Pustak Bhawan. Allahabad.
6. UNEP, 2007: Global Environment Outlook: GEO4: Environment For Development, United Nations Environment Programme

Assessment Rubrics:

Evaluation Type	**Marks**
End Semester Evaluation	**50**
Continuous Evaluation	**50**
a) Test Paper - 1	15
b) Test Paper - 2	
c) Assignment	15
d) Seminar	
e) Book/Article Review	
f) Viva-Voce	
g) Field Report- Documentary	20

Total	100

KU05DSCGEO303 ECONOMIC GEOGRAPHY

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
V	DSC	300-399	KU05DSCGEO303		4	60
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE(Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	30	70	100	2

Course Description:

This course in Economic Geography offers students a comprehensive exploration of the spatial dimensions of economic activities, equipping them with a nuanced understanding of the intricate relationships between space and economic processes. Throughout the course, students delve into the spatial organization of economic activities and dissect global economic systems. the course prepares students to communicate effectively about economic geography concepts and engage in discussions on the geopolitical dimensions of global economic interdependencies. By the course's conclusion, students emerge with a well-rounded skill set, enabling them to conduct independent research, analyze complex economic patterns, and contribute meaningfully to discussions on the evolving economic landscapes at local, regional, and global scales.

Course Prerequisite : NIL

Course Outcomes :

CO No	Expected Outcome	Learning Domains
1	Develop an understanding on how geographical factors organize economic space	U
2	Acquire knowledge about spatial patterns of various economic activities on the earth.	A
3	Evaluate the interconnectedness of global economic systems	E
4	Engage in critical discussions about the geopolitical aspects of economic geography	An

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓					
CO 3							✓
CO 4						✓	

COURSE CONTENTS

Contents for Classroom Transaction :

MODULE	UNIT	DESCRIPTION	HOURS
1		**Economic Geography- Introduction**	14
	1	Meaning and Scope of Economic Geography	
	2	Concept and classification of Economic activities	
	3	Approaches and Fundamental Concepts of Economic Geography	
	4	Factors Affecting location of Economic Activity	
2		**Resources**	14
	1	Concept and classification	
	2	Mineral Resources- World Distribution	
	3	Energy resources- World Distribution	
	4	Conservation and Management of Resources for Sustainable Development	
3		**Agriculture and Allied Sectors**	14
	1	Forestry, livestock, animal husbandry and fisheries	
	2	Agriculture: Subsistence and Commercial	
	3	Factors affecting agriculture	
	4	Challenges faced by primary economic sector	
		Secondary and Quaternary Sectors	
	1	Industries-factors of localization, location theory (Weber), major industries - iron and steel, textile, chemicals, paper	

4	2	Transport: major water, land, and air transport; geographical factors in their development	14
	3	Internal and International Trade, Major Trade Blocs	
	4	Quaternary activities – Information and communications technology industry	
5	**Teacher Specific Module**		
	Directions		
	Prepare atlas showing the distribution of resources		4
	Visit any industry in the locality to map the factors responsible for its location and working conditions in the industry.		

Essential Readings:

1. Alexander J. W. (1963). Economic Geography. New Jersey, USA: Prentice-Hall Inc.
2. Coe N. M., Kelly P. F. and Yeung H. W. (2007). Economic Geography: A Contemporary Introduction, USA: Wiley-Blackwell.
3. Combes P., Mayer T. and Thisse J. F. (2008). Economic Geography: The Integration of Regions and Nations. USA: Princeton University Press.
4. Durand L. (1961). Economic Geography. USA: Crowell.
5. Roy,Prithwish (2014). Economic Geography (6thedition), New Central Book Agency
6. Gautham, Alka (2015).Advanced economic geography (4^{th} edition), Sharda Pusthak Bhavan
7. Maurya, SD (2022). Resource Geography, Pravalika publications.
8. Barnes, T. J., & Christophers, B. (2018). Economic geography: A critical introduction. John Wiley & Sons.

Suggested Readings:

1. Saxena, H.M., (2013). Economic Geography, Rawat Publications, Jaipur
2. Hartshorne,T.N. and Alexander,J.W., (1988). Economic Geography, Prentice Hall, New Delhi.
3. Jones CF and Darkenwald, G.G. (1975).Economic Geography Mc.Millan Company, New York.
4. Hodder B. W. and Lee R. (1974). Economic Geography. UK: Taylor and Francis.
5. Wheeler J. O., (1998). Economic Geography. USA: Wiley.
6. Willington D. E., (2008). Economic Geography. UK: Husband Press.
7. Knowles, R. (1990). Economic and Social Geography made simple, Rupa Publication.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment	20
d)	Seminar	

e)	Book/Article Review	
f)	Viva-Voce	
g)	Field Report	15
Total		**100**

KU05DSCGEO304 FIELD WORK AND RESEARCH METHODOLOGY (PRACTICAL)

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
V	DSC	300-399	KU05DSCGEO304		4	120
Learning Approach (Hours/Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
0	8	0	50	50	100	2

Course Description:

Essential characteristic of geography is the desire to explore more about the world in which we live; to record its many parts, ceaselessly to encounter the strange and new, and yet return to our roots - to the place we have chosen to call home. Geography emerged as an institutionalized academic endeavor by positioning itself as the study of the Earth's surface. Surface includes not only the solid land but also the envelope of atmosphere immediately above it, structures that lie immediately below it, and the social and cultural environments contributed by the people who occupy it. Geographers look at these phenomena and processes from local to global scales - making geography a broad dynamic discipline.

The course introduces young geography students to explore the nature of academic geographies and various traditions in its methodological praxis. It equips them to critically engage with the integrative traditions in geographical methods by positioning geographical research in an interdisciplinary perspective. It trains students on various methods of research and sources of data in geography and their underlying epistemological discourses. By encouraging research aptitude amongst the students, course seeks to promote ethical practices in research activities.

Course Pre requisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand philosophical underpinnings of research methods.	U
2	Detailed exposure of new geographical landscape as a study area.	A
3	In-depth knowledge of different field techniques.	An
4	Understanding field ethics and different tools of field study.	E

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓					
CO 3			✓				
CO 4				✓			

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Geographic Enquiry**	20
	1	Research: Meaning and Types	
	2	Routes of scientific explanation: Inductive, Deductive, Abductive; Research Approaches- Quantitative, Qualitative and Mixed methods	
	3	Nature of Geographic Inquiry: Questions investigated, Models for Geographic Inquiry	
	4	Values and Ethics in Research; Intellectual Property Rights	
2		**Developing Research Proposal**	30
	1	Identifying the research problem and study area	
	2	Literature review	
	3	Framing research questions, hypothesis, objectives	
	4	Sources of Data and Methods	

3		**Data collection and fieldwork**	30
	1	Field Visit and collecting primary data using various techniques	
	2	Collect Socio-economic Data: Observation (Participant/Non-Participant); Questionnaires (Open/Closed/ Structured/Non-Structured); Interviews (Key-informant, in-depth) and Focus Group Discussions	
	3	Spatial Survey: Transects and Quadrants, Triangulation, Constructing a Sketch; Use of GPS	
	4	Physical Data: Riverbed survey, soil sample collection	
4		**Data analysis, Interpretation and Report Writing**	30
	1	Data coding, editing and feeding	
	2	Qualitative and Quantitative Data Analysis	
	3	Data Representation Techniques	
	4	Designing the Field Report: Organization and preparation, referencing, endnote, footnotes, supplementary materials	
5		**Teacher Specific Module: Field Work**	10
		A piolet survey may be conducted on the campus to introduce various survey instruments to students and equip them for field work.	
		A field camp in any of the localities in Kerala should be conducted. The duration of the field work should not exceed 10 days.	
		Each student will prepare an individual report based on primary and secondary data collected during field work.	
		The word count of the report should be about 5000 to 8,000 excluding figures, tables, photographs, maps, references and appendices.	

Essential Readings:

1. Creswell J., 1994: Research Design: Qualitative and Quantitative Approaches Sage Publications.
2. Dikshit, R. D. 2003. The Art and Science of Geography: Integrated Readings. Prentice-Hall of India, New Delhi
3. Stoddard R. H., 1982: Field Techniques and Research Methods in Geography, Kendall/Hunt.
4. Wolcott, H. 1995. The Art of Fieldwork. Alta Mira Press, Walnut Creek, CA.

Suggested Readings:

1. Lavrakas, P. J. (2008). Encyclopedia of survey research methods. Sage publications.
2. Ridley, D. (2012). The literature review: A step-by-step guide for students.
3. Sarkar, A. (2015). Practical geography: A systematic approach. Delhi, India: Orient Black Swan Private Ltd.
4. Sarkar, A. (2013). Quantitative Geography: Techniques and Presentation. Delhi, India: Orient Black Swan Private Ltd.
5. Mukherjee, Neela. (1993). Participatory Rural Appraisal: Methodology and Application.

Delhi, India: Concept Publs. Co.

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment/Practical Excercse as part of module 5	20
d)	Seminar	15
e)	Book/Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		**100**

KU5DSEGEO301 World Regional Geography

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
V	DSE	300-399	KU5DSEGEO301	4	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE(Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

The course in World Regional Geography presents an immersive exploration of the diverse global, landscapes, examining continents through distinct modules dedicated to their unique physiography, population dynamics, and economic foundations. Students embark on a journey across continents, delving into the physical characteristics that shape their geographies, understanding the

intricacies of population distribution, and analyzing the economic structures that define each region. By navigating through these modules, students gain a holistic perspective on the interplay between physical geography, demographics, and economic activities, cultivating a nuanced understanding of the complexities that contribute to the unique identity of each global region.

Course: Pre requisite : NIL

Course Outcomes:

CO No	Expected Outcome	Learning Domains
1	Understand the concept of a region and its various types	U
2	Identify major natural regions of the world and interconnectedness of physical and human features over there.	U
3	Examine the role of physical setting on the regional development of various regions	E
4	Analyse the causes and consequences of regional disparities in the world	An

**Remember(R), Understand (U), Apply(A), Analyse(An), Evaluate(E), Create(C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓					
CO 3			✓				
CO 4						✓	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
	Region and regionalization		

1	1	Region concept in geography, and its types (Formal, functional, and planning)	14
	2	Methods of regionalization	
	3	Natural regions of the world	
	4	Basic physiography - Relief, Drainage, Climate, Natural Vegetation, Soils.	
2	1	**Tropics - Man environment and activities**	14
	2	Equatorial region	
	3	Monsoon region	
	4	Tropical deserts and Tropical grass lands	
3		**Temperate and polar region - Man environment and activities**	14
	1	Mediterranean region	
	2	Temperate grass lands	
	3	Taiga	
	4	Tundra	
4		**Case studies (Physical and socio-economic setting)**	14
	1	Australia	
	2	USA	
	3	China	
	4	Argentina	
5	**Teacher Specific Module**		4
	Directions		
	Practical exercise involving methods of regionalization. 1. *Flow analysis* 2. *Overlay method/Super imposition method* 3. *Composite index method* 4. *Gravitational analysis*		

Essential Readings:

1. Christopher L Satter, Jospeh J Hobbs. Essentials of World Regional Geography, Thompson Books
2. Deblij,H.J. (1994). Geography: Regions and Concepts, John Wiley, New York.
3. Maurya,SD (2015).World Regional Geography. Pravalika Publications. Allahabad
4. Gautam,A (2015). Regional Geography of the World. Sharda Pustak Bhawan. Allahabad
5. Hussain,M(2016). World Geography. Rawat Publications. Jaipur
6. Alka Gautam(2007). World Geography, Sharda Pustak Bhawan, Allahabad.
7. Tikkha,Bali,Sekhon(2007). WorldRegionalGeography,New Academic Publishing Co., Jalandhar

Suggested Readings:

1. Nijman, Muller and Shin (2020). The world today: Concepts and regions in geography. Wiley
2. http://caitiefinlayson.com/WRGTextbook.pdf(Ebook)
3. Manku, D S (2017). A Regional Geography of the World. Kalyani Publishers: New Delhi
4. J Kole (1996). A Geography of the World's Major Regions. Routledge: London.

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment/Practical Excercse as part of module 5	20
d)	Seminar	15
e)	Book/Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		**100**

KU05DSEGEO302 POLITICAL GEOGRAPHY

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
V	DSE	300-399	KU05DSEGEO302		4	60
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE(Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

This course attempts to provide a comprehensive understanding of how space, place, and territory influence political dynamics, governance structures, and geopolitical relations. The course begins by exploring foundational concepts in political geography, including the nature of political borders, territoriality, sovereignty, and the role of

space in shaping political identities and power relations. Students will examine different theories and approaches within political geography, such as geopolitics, critical geopolitics, and territoriality studies, to analyze how states and non-state actors navigate and contest space for political ends.

Course Prerequisite : NIL

Course Outcomes:

CO No	Expected Outcome	Learning Domains
1	Understand the interlinkage of space and power politics.	U
2	Comprehend and apply key concepts and theories in political geography and geopolitics.	A
3	Analyze the historical formation of nation State.	An
4	Critically evaluate the geographies of resource conflicts in contemporary world.	E
5	Analyze and interpret the influence of geographical factors on electoral processes.	An

****Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C)***

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓	✓					
CO 2		✓					
CO 3	✓						
CO 4		✓				✓	
CO 5			✓				✓

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Political Geography and Geopolitics**	14
	1	Nature, scope of political geography; perspective and approaches in political geography	
	2	Geopolitics- meaning and concept, determinants and divisions of world regions	
	3	Historical overview of geopolitical world order- Imperialist and Cold War geopolitics; Globalization and Liberal Democracy	
	4	Theoretical Frameworks: Heartland and Rimland Theory; World System Theory, Marxian Theory, Realist Theory	
2		**State, Nation and Nation State**	14
	1	Concept of Nation and State and Nationalism	
	2	Attributes of State– Frontiers, Boundaries, Shape, Size, Territory and Sovereignty	
	3	Frontiers and Boundaries- Concept and Types	
	4	Territorial State System- historical development; and Nation State and Federalism	
3		**Electoral Geography**	14
	1	Methods in electoral geography and Geographic Influences on Voting pattern	
	2	Geography of electoral support and representation: constituencies and their evolution in Indian context; and Gerrymandering	
	3	India's political alliance; role of caste, religion and language in electoral politics and party systems	
	4	Politico electoral regions of India	
4		**Resource Conflicts & Politics of Displacement**	14
	1	Internal colonization separate state movement in India: Jharkhand movement, Uttarakhand movement	
	2	Water Sharing Disputes- International and India Disputes	
	3	Conflicts Related to Forest Rights and Minerals- International and India	
	4	Issues of relief, compensation and rehabilitation: with reference to Dams, National Highway Development and Special Economic Zones	
		Teacher Specific Module	
	Directions		

5	Seminar on following topics: 1. Climate change and the geopolitics of Indian Ocean 2. Politics of Arctic Governance 3. Globalization, Nation State and Global Refugee Crisis 4. Biopolitics and Biopower	4

Essential Readings:

1. Adhikari, S. 1997. Political Geography, Rawat publications, Jaipur and Delhi
2. Agnew, J. 2002. Making Political Geography, Arnold, London
3. Agnew, J., Mitchell, K. and Toal, G. eds.2003.A Companion to Political Geography, Blackwell, Oxford
4. Cohen, S. .1964. Geography and Politics in a World Divided, Random House, New York
5. Cox, K.R., .2002.Political Geography: Territory, State and Society, Wiley-Blackwell, Chichester
6. Glassner M.,1993: Political Geography, Wiley.
7. Hodder Dick, Sarah J Llyod and Keith S M., 1998. Land Locked States of Africa and Asia (vo.2), Frank Cass.
8. Jeffrey, A. and Painter, J., 2008. Political geography: An introduction to space and power. Sage.
9. Smith, S., 2020. Political geography: A critical introduction. John Wiley & Sons.
10. Jones, M., Jones, R., Woods, M., Whitehead, M., Dixon, D. and Hannah, M., 2014. An introduction to political geography: space, place and politics. Routledge.

Suggested Readings:

1. AgnewJ.,2002. Making Political Geography, Arnold.
2. Agnew J.,Mitchell K.and ToalG.,2003: A Companion to Political Geography, Blackwell.
3. Cox .R.,Low M.and Robinson J.,2008:The Sage Hand book of Political Geography, Sage Publications.
4. Painter, J., 1995. Politics, Geography and 'Political Geography': A Critical Perspective. London: Arnold
5. Mellor,R.E.H. 2015. Nation, State and Territory: A Political Geography. United Kingdom: Taylor & Francis.
6. Painter J. and Jeffrey A., 2009: Political Geography, Sage Publications.
7. Gallaher C.,et al., 2009. Key Concepts in Political Geography. Sage Publications.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment	10
d)	Seminar	15
e)	Book/Article Review	10

f)	Viva-Voce	
g)	Field Report	
Total		**100**

KU06DSCGEO301 NATURE AND PHILOSOPHY OF GEOGRAPHY

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VI	DSC	300-399	KU06DSCGEO301		4	60
Learning Approach (Hours/Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

The course enables students to explore how geographical thought has developed over time, from ancient civilizations to the present day. It introduces key concepts, methodologies, and debates that have influenced geographical thinking, such as environmental determinism, possibilism, positivism, radicalism etc. Moreover, students will critically analyze the contributions of prominent geographers and philosophers to the field, considering their impacts on societal perceptions of space, place, and landscape. By tracing the historical and philosophical roots of geographical thought, students will gain a deeper understanding of the complexities inherent in the study of geography and its relevance to contemporary global challenges.

Course Prerequisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	In depth understanding about the evolution of geographical thought	U
2	Detailed knowledge about the paradigms and debates in the geographical studies.	A
3	Understanding of emerging traditions and practices in geography	An

4	Critically appreciate how the past shaped the present of geography	E

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1		✓					
CO 2	✓						
CO 3			✓				
CO 4						✓	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Paradigms in Geography**	14
	1	Definition, Nature and Traditions in Geography	
	2	Place of Geography in Classification of the Sciences	
	3	Paradigmatic Shifts (as per Kuhn's Model); Traditions in Geography (Pattison)	
	4	Major Paradigms in Geography (Environmentalism, Regional & Spatial)	
2		**Geography during the Pre-Modern Period**	14
	1	Classical Philosophies: Greek and Roman School	
	2	Medieval Period: Arab and Chinese School	
	3	Geographical Traditions in India	
	4	Age of Discovery and its Impact; Colonialism and Geography	
3		**Modern Geographical Thought**	14
	1	Disciplinary Trends in Germany	
	2	French Geographical School	
	3	Geography in Britain	

	4	Development of Geography in USA	
4	**Contemporary Trends in Geography**		
	1	Quantitative Revolution & System's Approach	14
	2	Behaviouralism and Humanism	
	3	Radicalism and Feminism	
	4	Post-modernism and post-colonialism	
5	**Teacher Specific Module**		
	Reading and reviewing academic book		4
	Illustrate and stage any dramatic movement in the history of geographical thought (eg. Schaefer-Hartshorne Debate and the Quantitative revolution; Age of discovery and voyages; environmental determinism versus possibilism)		

Essential Readings:

1. Cresswell, T. (2024). Geographic thought: a critical introduction. John Wiley & Sons.
2. Holt-Jenson, A. (2011), Geography: History and Concepts: A Students Guide, Sage.
3. Dikshit, R.D. (1997), Geographical Thought: A Contextual History of Ideas, Prentice Hall of India.
4. Nayak, A., & Jeffrey, A. (2013). Geographical thought: An introduction to ideas in human geography. Routledge.
5. Martin, G. J. (2005). All possible worlds: A history of geographical ideas. OUP Catalogue.
6. Sudeepta, A. (2015). Fundamentals of Geographical Thought. Delhi, India: Orient Black Swan private limited.
7. Thakur, B. (1994) Indian Geography: Development, Trends and Prospects, Trans. Inst. Indian Geographers, 16(1): 67-85.
8. Singh, R.S. (2009). Indian Geography: Perspectives, Concerns & Issues, Rawat Publications.

Suggested Readings:

1. Pauline Couper (2015) A Student's Introduction to Geographical Thought; SAGE Publications.
2. Arentsen M., Stam R. and Thuijis R., 2000: Post-modern Approaches to Space, ebook.
3. Bhat, L.S. (2009) Geography in India (Selected Themes). Pearson
4. Hartshone R., 1959: Perspectives of Nature of Geography, Rand MacNally and Co.
5. Johnston R. J., (Ed.): Dictionary of Human Geography, Routledge.
6. Soja, Edward 1989. Post-modern Geographies, Verso, London. Reprinted 1997: Rawat Publ., Jaipur and New Delhi.
7. Dikshit, K.R. (2006). "The Changing Western Perspective on geography and the Indian Context", Transactions, Institute of Indian Geographers, 28 (2): 123-155.
8. Dikshit, R.D. (2001). "Indian geography: An encounter with reality", Transactions, Institute of Indian Geographers, 23 (1 & 2).
9. Kumar, B. (2022) Geography: Paradigm and Contemporary Development, Ghaziabad: Globe Publishing House

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment	15
d)	Seminar	10
e)	Book/Article Review	10
f)	Viva-Voce	
g)	Field Report	
Total		**100**

KU06DSCGEO302 URBAN GEOGRAPHY

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VI	DSC	300-399	KU06DSCGEO302		4	60
Learning Approach (Hours/Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

Urban geography is a field of study within human geography that focuses on the spatial aspects of cities and urban areas. It explores the patterns, processes, and dynamics of urban spaces, examining how cities are organized, function, and change over time. It focusses on the interplay between human activities and the physical environment within urban areas, as well as the social, economic, cultural, and political factors that shape urban development and equips with the knowledge and skills to understand urban challenges, critically analyze urban policies, and contribute to the planning and development of sustainable and livable cities.

Course Prerequisite : NIL

Course Outcomes:

CO No	Expected Outcome	Learning Domains
1	Understand the scope and approaches of urban studies and complexities of urban area	U
2	Understand the development of transformation of cities over time, morphology and structure of cities	An
3	Analyse the social organization of the city	A
4	Develop a basic social, political and economic understanding of contemporary urban issues	E
5	Assess and evaluate the dimensions of urbanization in India and its trends	E

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓					
CO 3		✓					
CO 4			✓				
CO 5						✓	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Introduction to Urban Geography**	14
	1	Urban studies and Urban Geography: Nature and evolution; approaches and contemporary trends	
	2	Origin and Evolution of urban centres	
	3	Urbanization and Urban Growth; Dimensions of Urbanization and structural changes	
	4	World urbanization– trends, patterns; challenges in developing world	
2		**Urban System**	14
	1	Urban settlement system, City region- city periphery relations-–rural urban fringe	
	2	Urban Economic base- Urban function, interaction and classifications	
	3	Urban hierarchy, rank size rule, primate cities; Central places – Christaller and Losch models	
	4	Morphology of cities – land use Models - Urban Ecology, urban transport	
3		**City Scape**	14
	1	Urbanism and the emergence of urban cultures and sub-cultures; Social organisation of the city- Ghettoization, Gentrification and social exclusion in cities; social area analysis	
	2	Cities and Functions: Functional Classification by- Aurousseau, Harris, Howard Nelson and Ashok Mitra's classification	

	3	Globalization and cities: Global City, World City, Smart Cities, Network City	
	4	Principles of urban planning	
4	**India's Urban Experience**		14
	1	Nature of and pattern of Indian Cities, Trends of urbanization in India	
	2	Problems of Housing, Slum and Urban transport in India with special reference to Metropolitan cities- Delhi, Mumbai, Kolkata and Chennai	
	3	Urbanization in Kerala: Trends and Characteristics	
	4	Urban Governance and Planning with reference to India and Kerala	
5	**Teacher Specific Module**		
	Direction		
	Writing exercise: A narrative of the City- Urbanization and its People (Develop an ethnographic story of a city/neighborhood through the narratives of communities, their society, and their situatedness.		4
	Practical exercise: rank size rule, Central Place Theory; functional classification of the cities		

Essential Readings:

1. Andrew, E.G.J, McCann, E and Thomas, M 2015. Urban Geography: A Critical Introduction, Wiley, Blackwell, UK.
2. Friedmann, J. 1995. Where we stand: A Decade of World City Research, In: P. L. Knox and P. Taylor (eds) World Cities in a World-system. 21-47. Cambridge University Press, Cambridge:
3. Hall, T. 2002. Urban Geography (2nd Edition), Routledge: London and NewYork
4. Harold Carter (1995) The Study of Urban Geography, Arnold, London
5. Knox, P and Pinch, S. 2010.Urban Social Geography (6th edition), Pearson: England
6. Majid Husain (2003) Urban Geography, Anmol Publications, New Delhi.
7. Mandal R B (2000) Urban Geography, Concepts Publishing Company, New Delhi.
8. Misra, R.P. (ed.) 2013. Urbanization in South Asia: Focus on Mega Cities, Cambridge University Press, New Delhi.
9. Ramachandran R (1992) Urbanization and Urban Systems in India, Oxford University Press, Delhi.
10. Singh R Y (2002) Geography of Settlement, Rawat Publication, Jaipur.

Suggested Readings:

1. Bhattacharya, B. 2006. Urban Development in India since Pre-Historic Times, Concept Publishing Company, New Delhi.
2. Bridge, G Watson, S. (eds.) 2010. The Blackwell City Reader (2nd Edition), Wiley- Blackwell, UK.
3. Brunn, S.D., Hays-Mitchell, M., Ziegler, D.J. 2012. Cities of the World: World Regional Urban Development (5th edition), Rowman and Littlefield Publishers: England
4. Datta, A. and Shaban, A. (eds), 2017. Mega-Urbanization in Global South: Fast Cities

and New Urban Utopias of the Post-colonial State, Routledge: London and New York.
5. Hardoy, J. E., Mitlin, D. Satterthwaite, D. 1992. Environmental Problems in Third World Cities, Earthscan, Great Britain.
6. James H Johnson, Urban Geography-An Introductory Analysis
7. LeGates T.R. and Stout F. (ed.) 2016. The City Reader (6th edition), Routledge: London and New York.
8. Nandy, A, 2001. An Ambiguous Journey to the City: The Village and other Odd Ruins of the Self in the Indian Imagination, New Delhi: OUP.
9. Roberts, P., Ravetz, J. and George, C. 2009. Environment and the City. Routledge, London
10. Sassen, S (ed.) 2002. Global Network, Linked Cities, New York: Routledge.
11. Scott, A.J. 2002. Global City-Regions: Trends, Theory, Policy, Oxford: OUP.
12. Sivaramakrishnan (1996) Urbanization in India, Concepts Publishing Company, New Delhi.
13. Southhall, A. 1998. The City in Time and space, Cambridge, Cambridge University Press.
14. Vaysali Singh (2011) Urban Geography, Alfa Publication, New Delhi.
15. White, R. 1994. Urban Environmental Management, Routledge, London

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	10
b)	Test Paper - 2	
c)	Assignment	20
d)	Seminar	20
e)	Book/Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		**100**

KU06DSCGEO303 DIGITAL IMAGE PROCESSING (PRACTICAL)

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VI	DSC	300-399	KU06DSCGEO303		4	120
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
0	8	0	50	50	100	2

Course Description:

The course is designed to introduce students to the fundamental concepts and applications of remote sensing technology. This course emphasizes hands-on experience, providing students with the skills needed to acquire, analyze, and interpret remote sensing data. Through practical exercises and projects, students will learn how to apply remote sensing techniques in various fields such as environmental monitoring, agriculture, urban planning, and disaster management.

Course Prerequisite: Nil

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	To create a basic knowledge on different types of remote sensing, basic principles of remote sensing	U
2	To make the students aware about the significance of the applications of remote sensing as a tool for monitoring objects & phenomena and suggesting their strategic management.	A
3	Examine the recent trends in RS technology and its application in various fields of research.	An
4	To apply the potentials of remote sensing technology in multidisciplinary research and to make suggestions for various problems	E

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓		✓			
CO 3			✓	✓			✓
CO 4						✓	✓

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**DIGITAL IMAGE PROCESSING**	20
	1	Satellite data acquisition, Storage and retrieval, Data Formats, Importing Satellite Image,	
	2	Geometric Correction, Georeferencing, Raster and Vector Georeferencing	
	3	Image to image rectification, Subset, Projection conversion	
	4	Introduction to ERDAS Imagine and various open softwares for remote sensing data interpretation.	
		IMAGE ENHANCEMENT TECHNIQUES	
	1	Noise Reduction, Mosaic, Composite Bands	

2	2	Resolution merge, Visual interpretation of multispectral and Panchromatic Image	30
	3	Histogram stretching, linear, non-linear stretching, histogram equalization	
	4	Image rectification, image differencing, image rationing,	
3	**DIGITAL ANALYSIS**		30
	1	Classification techniques, feature extraction, Digital Image interpretation, Pattern recognition, shape analysis, Textural analysis	
	2	Supervised classification- Minimum distance to means classifier, parallelepiped classifier, Gaussian maximum likelihood classifier. Training Stage: Graphical representation of the spectral response patterns,	
	3	Unsupervised classification- Iso Cluster Unsupervised Classification, Hybrid Classification of Mixed Pixels.	
	4	Ground Truth verification, Data output -Graphic Products tabular data	
4	**ACCURACY & IMAGE INTERPRETATION**		30
	1	Accuracy assessment	
	2	Integration of GIS data.	
	3	Image Fusion, Stitching of Images, Change Detection from Multi-Temporal imagery and analysis	
	4	Thematic layout and Interpretation	
5	**Teacher Specific Module**		
	Directions Prepare a practical file containing exercises based on the procedures mentioned in each module. Each student should be allotted with a study area and a theme such as ground water potential mapping, landslide susceptibility mapping etc., then they download satellite imageries pertain to their area of interest for the variables relevant to their theme. A thematic atlas will be produced at the end of the course.		10

Essential Readings:

1. Campbell J. B. and Wynne R. H. (2008) Introduction to Remote Sensing, Fifth Edition, The Guilford Press, New York, 718p.

2. Falkne, E. and Morgan D. (2002) Aerial Mapping: Methods and Application. Lewis Publishers, Boca Raton, 192p.
3. Aronoff S, (1989) Geographic Information Systems: A Management Perspective, WDL Publications
4. Burrough, P.A. (2005), Principles of GIS for Land Resource Assessment, Oxford Publications, 2005
5. James B Campbell and Randolph H W (2011) Introduction to Remote Sensing, Gulford Press, New York.
6. Basudeb Bhatta (2008) Remote Sensing and GIS, OUP India Publication.
7. Christian Matzler (2006) Thermal microwave radiation: Applications for remote sensing, The Institution of Engineering and Technology, London.
8. Lillesand T M, Kiefer R W and J W Chipman (2008) Remote sensing and Image Interpretation, John Wiley, New Delhi.
9. Christian Matzler (2006) Thermal microwave radiation: Applications for remote sensing, The Institution of Engineering and Technology, London.

Suggested Readings:

1. Lillisand, T.M. And P.W.Kiefer, 1986: Remote Sensing And Image Interpretation,John Wiley & Sons, New York.
2. Sabins, F.F.Jr., 1978: Remote Sensing Principles And Interpretation, Freeman, Sanfrancisco.
3. Remote Sensing and Environment, Elsevier Publication
4. Journal of Geodesy, Springer Publication.
5. IEEE Transactions on Geoscience and Remote Sensing, Institute of Electrical and Electronics Engineers Inc.
6. Remote Sensing in Ecology and Conservation, Zoological society of London, Online ISSN:2056-3485
7. Sailesh Samanta, A Text Book of Remotesensing , GIS and GNSS, Nation press Publication.

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment	
d)	Seminar	
e)	Book/Article Review	
f)	Viva-Voce	10
g)	Record File	25
Total		**100**

KU06DSEGEO301 GEOGRAPHY OF AGRICULTURE AND FOOD SECURITY

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VI	DSE	300-399	KU06DSEGEO301		4	60
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE(Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

Agricultural Geography is concerned with the spatial variations, distribution and location of agricultural activities on the earth's surface and the factors responsible for them. It is dominated by the interrelationship and effects of both physical and socio-economic factors on spatial farm enterprises and farm operations. Agricultural Geography addresses bio-physical determinants of agricultural patterns and productivity; socio- cultural and economic determinants of agricultural patterns and productivity; agricultural activities and spatial organization; agricultural decision-making analysis; agricultural technological changes; agriculture and economic development; and global emerging issues in agriculture from spatial and temporal perspectives.

Course Pre requisite : NIL

Course Outcomes:

CO No	Expected Outcome	Learning Domains
1	Understand about the introduction to agriculture, nature, scope, significance and Development of agriculture geography, study approaches applied in agriculture	U
2	Understand the influence of physical, Economic and Technological factors on agriculture patterns.	An

3	Understand the agricultural system its meaning and concept, Whittlesey's classification of agricultural system, types of	A
	agricultural, study the types of agricultural in respect of area, salient features and their problems.	
4	Understand the agricultural regionalization and modes in agricultural geography and their classification of agricultural models and some theories.	E
5	Identify the problems and prospects of Indian agriculture	E

Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C)

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓					
CO 3	✓						
CO 4					✓		
CO 5							✓

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Introduction to Agriculture**	14
	1	Nature, Scope and Significance in the development of Agricultural Geography	
	2	Approaches to the study of Agricultural Geography	
	3	Origin and evolution of Agriculture, Types of Agriculture	
	4	Determinants of Agriculture	
2		**Agricultural Regionalization**	14
	1	Land Use and Land capability classification	
	2	Crop Combination, crop concentration, Crop diversification and agricultural productivity	
	3	Agricultural location Theories- Von Thunen agricultural model	
	4	Whittlesey's agricultural systems of the world	

3	**Indian Agriculture**		14
	1	Agricultural regions of India	
	2	Agro-climatic regions of India	
	3	Green Revolution and Organic farming movement	
	4	Problems and Prospects of Indian agriculture	
4	**Food Security**		14
	1	Agro-food system linkages	
	2	Poverty and Hunger- concept and measures	
	3	Food security and Food Sovereignty	
	4	Public Distribution System and Right to Food	
5	**Teacher Specific Module**		
	Directions		
	Practical exercises 1. Major sources of agricultural statistics- India and Kerala 2. Calculate inequality in the distribution of landholding- Lorenz Curve method. 3. Measurement of agricultural productivity and crop diversification 4. Crop combination using Weaver's method		4

Essential Readings:

1. Bansil,B.C.(1975):'Agricultural Problems of India', Delhi.
2. Berry,B.J.L.et.al.(1976):The Geography of Economic Systems.Prentice Hall, New York.
3. Gregor,H.P.:Geography of Agriculture.Prentice Hall,NewYork, 1970.
4. Grigg,D.(1984):'An Introduction to Agricultural Geography',Hutchinson Publication, London
5. Hartshorn,T.N.and Alexander,J.W.(1988):Economic Geography.PrenticeHall, New Delhi.
6. MorganW.B.and Norton,R.J.C.(1971): Agricultural Geography. Mathuen, London,
7. Morgan,W.B.and Munton,R.J.C.(1977):'Agricultural Geography'Methuen, London.
8. Sauer,C.O.(1952):'Agricultural Origins and Dispersals',American Geographical Journal
9. Sauer,C.O.(1969):Agricultural Origins and Dispersals.M.I.T.Press,Mass, U.S.A.
10. SinghJ.(1997):Agricultural Development in SouthAsia:A Comparative A Study in the Green Revolution Experiences, national Books Organization, New Delhi.
11. Singh,J.andDhillon,S.S.(1984):'Agricultural Geography',McGrawHill, New Delhi.
12. Symons,L.(1972):'Agricultural Geography',Belland Sons,London.
13. Tarrant,J.R.(1974):AgriculturalGeography, Problems in Modern Geography Series, John Wiley and Sons. Page 2 of 3

Suggested Readings:

1. Bayliss Smith,T.P.(1987):The Ecology of Agricultural Systems.Cambridge University Press, London
2. Morgan,W.B.(1978):Agriculture in the Third World-A Spatial Analysis.Westview Press, Boulde.
3. Sauer,C.O.(1969):Agricultural Origins and Dispersals.M.I.T.Press,Mass, U.S.A.
4. SinghJ.(1997):Agricultural Development in SouthAsia: A Comparative A Study in the Green Revolution Experiences, National Books Organization, New Delhi.
5. TheHindu(2006):Survey of Indian Agriculture2006. New Delhi.
6. Wigley,G.(1981), TropicalAgriculture:The Development of Production, 4thedition, Arnold, London.

Assessment Rubrics:

Evaluation Type	Marks

End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment/Practical work outlined in Module 5	20
d)	Seminar	15
e)	Book/Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		**100**

KU06DSEGEO302 GEOGRAPHY OF TOURISM

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VI	DSE	300-399	KU06DSEGEO302		4	60
Learning Approach (Hours/Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

The course "Geography of Tourism" explores the relationship between tourism and geography, focusing on the spatial aspects of tourism development, destinations, and impacts. It examines how geographical factors shape and influence tourism activities, patterns, and experiences around the world.

Course Pre-requisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand the significance of tourism as a human expression in spatial context.	U
2	Evaluate the significance of tourism in the cultural, social, economic and environmental milieu of geographic spaces.	A
3	Analyse various types of tourism and their geo-backup	An

4	Examine the spatial dimensions of tourism attractions at national and international level	E
5	Evaluation of emerging tourist research paradigms and tourism planning	E

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓	✓					
CO 2		✓					
CO 3		✓	✓				
CO 4		✓					
CO 5							✓

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Introduction**	14
	1	Tourism – Concept, nature, scope, and importance	
	2	Components of tourism – approaches to the study of tourism	
	3	Significance of tourism in social, cultural and economic realms	
	4	Tourism and resources: water, climate, natural and cultural landscape and Wildlife resources	
2		**Factors affecting Tourism**	14
	1	Factors influencing the growth of tourism – Infrastructure and support systems	
	2	Concepts of mobility and spatialities in tourism, tourism fluxes	
	3	Cultural geography of tourism and leisure, Gender differences in Leisure	

	4	Place marketing and place formation- Spatial tradition of mobility, Time space Geography, Tourism Area Life Cycle	
3	**Types of Tourism**		14
	1	Types of Tourism -Eco-tourism, green tourism, Heritage tourism, Adventure tourism, Monsoon tourism, Niche tourism and medical tourism	
	2	Participation and community-based tourism, Responsible tourism, rural tourism and Urban tourism	
	3	Social, cultural and Economic significance of tourism, Multiplier effect on the economy - Impact of tourism on environment, carrying capacity and tourism development.	
	4	Climate change and tourism	
4	**Tourism Dynamisms**		14
	1	Global tourism flows – Distance decay and power curves, spatial dimensions of tourism attractions at national and international level	
	2	Major natural and cultural attractions in India with special reference to Kerala	
	3	Growth and development of tourism in spatio-temporal context Problems and prospects of Tourism in India, National Tourism Policy	
	4	Tourist Research Paradigms, Tourism-energy model, Tourism planning –Application of Geospatial Technology in tourism planning and modelling – Case studies	
5	**Teacher Specific Module**		4
	Data sources for tourism- local, district, state and national		
	Field work- identify tourism potential of a locality		

Essential Readings:

1. Krishan K Kamra Mohinder Chand, (2006), Basics of Tourism Theory, Operation and Practice, Kanishka Publishers
2. Naveen Kumar, (2018), Global Tourism Policies, Laws and Action Plans, Paradise Press, New Delhi
3. Arpita Mathur,2019, Fundamentals of Travel and Tourism, Ane Books Pvt.Ltd
4. Sampad Kumar Swain, Jitendra Mohan Mishra, (2012), Tourism Principles and Practices, Oxford University Press, New Delhi

Suggested Readings:

1. R.K. Goswami, (2007), Tourism and Environment, Cybertech Publications,New Delhi
2. Julie Wilson, (2012), The Routledge Handbook of Tourism Geographies, Routledge Publishers
3. Bhatia A K (1996), Tourism Development, Principles and Practices, SterlingPublishers
4. Kennell, J., 2016. Carrying capacity. In Encyclopedia of Tourism (pp. 133-135) Springer International Publishing

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment	10
d)	Seminar	15
e)	Book/Article Review	
f)	Viva-Voce	
g)	Field Report	10
Total		**100**

KU07DSCGEO401 SPATIAL DIMENSIONS OF DEVELOPMENT AND REGIONAL PLANNING

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VII	DSC	400-499	KU07DSCGEO401		4	60
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

Spatial planning is a critical process for guiding the sustainable development and management of land and resources within a geographical area. This course provides students with an in-depth understanding of the principles, methods, and practices of spatial planning and its role in shaping communities, regions, and landscapes. Through a multidisciplinary approach, students will explore the intersection of environmental management, social equity, and economic development to address complex spatial challenges.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains

1	Examine the major planning paradigms and their applications; and articulate processes leading to regional growth and development and provide rationales for planned interventions	An
2	Equip students with thorough knowledge of the concepts, theories and issues in Regional Planning and Development	U
3	Analyse the meaning and concept of modern economic growth; and Examine various Development issues and dimensions of Regional inequalities	A
4	Evaluate the salient features of Indian planning, Provide service to government, communities, and others concerned with urban and regional planning	E

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1			✓	✓			
CO 2	✓	✓				✓	
CO 3	✓						✓
CO 4			✓			✓	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
		Development and Inequality	
	1	Economic growth versus development; Efficiency-Equity Debat; Changing Concept of Development; Development as freedom	
	2	Measuring Development: Dimension and Indicators: PQLI and HDI	

1	3	Concept of underdevelopment; Economic development and inequality: Kuznets to Piketty	14
	4	Spatial dimensions of inequality: Regional imbalances in India- case studies	
2	**Concept of Regional Planning**		14
	1	Concept of Region, Types, Characteristics and Hierarchy of regions	
	2	Methods of delimitations of formal and functional regions	
	3	Regional Planning: Objective, Principles, and Significance, Types of Regional Planning	
	4	Regional planning processes, Norms and Standards for Regional planning; choice of a region for planning	
	Theories and Models for Regional Development		
3	1	Theories of economic growth/development: Adam smith's theory, Marxian theory, Schumpeter theory of economic development, Rostow's Theory	14
	2	Harrod-Domar model, Solow's Endogenous Growth Model	
	3	Growth Pole Theory of Perroux; Myrdal, Hirschman, and Friedmann	
	4	R.P. Misra's Growth Centre Model in Indian Context	
4	**Policies and Programmes**		14
	1	Goal-Based Development Agenda for the world and MDG	
	2	Dimension of Sustainable Development and SDG	
	3	Planning Commission and Special Area Development Plans in India, NITI Aayog's programmes for inclusive growth and development	
	4	Democratic Decentralization and People's Planning in Kerala: Village Level Success Stories	
5	**Teacher Specific Module**		
	Directions		
	Project on measuring regional imbalances by taking district as the unit of analysis. Data may be collected from census of India, panchayath statistics etc.		4

	Field visit to any village in Kerala to study the implementation of people's planning.	

Essential Readings:

1. Chandna, R. C. (2000): Regional Planning: A Comprehensive Text. Kalyani Publishers., New Delhi.
2. Chaudhuri, J. R. (2001): An Introduction to Development and Regional Planning with special reference to India. Orient Longman, Hyderabad.
3. Cowen, M.P. and Shenton, R.W. (1996): Doctrines of Development, Routledge, London.
4. Doyle, T. and McEachern, D. (1998): Environment and Politics. Routledge, London.
5. Friedmann, J. (1992): Empowerment: The Politics of Alternative Development. Blackwell, Cambridge MA and Oxford.
6. Friedmann, J. and Alonso, W. (ed.) (1973): Regional Development and Planning. The MIT Press, Mass.
7. Hettne, B., Inotai, A. and Sunkel, O. (eds.) (1999 – 2000): Studies in the New Regionalism. Vol. I-V. Macmillan Press, London.
8. Isard, W. (1960): Methods of Regional Analysis. MIT Press, Cambridge, MA.
9. Kuklinski, A. R. (1972): Growth Poles and Growth Centres in Regional Planning. Mouton and Co., Paris.
10. Kuklinski, A.R. (ed.) (1975): Regional Development and Planning: International Perspective, Sijthoff-Leydor.
11. Leys, C. (1996): The Rise and Fall of Development Theory. Indian University Press,Bloomington, and James Curry, Oxford.

Suggested Readings:

1. Mahapatra, A.C. and Pathak, C. R. (eds.) (2003): Economic liberalisation and Regional Disparities in India. Special Focus on the North Eastern Region. Star Publishing House, Shillong.
2. Mahesh Chand and Puri V K (2011), Regional Planning in India, Allied Publishers Private Limited, New Delhi.
3. Misra, R. P. (ed.) (1992): Regional Planning: Concepts, Techniques, Policies and CaseStudies. 2nd edition. Concept Publishing Company., New Delhi.
4. Misra, R.P. and Natraj, V.K. (1978): Regional Planning and National Development. Vikas, New Delhi.
5. Nath, V. 2009. Regional Development and Planning in India, Concept Publishing Company.
6. Sundaram K V 1997, Decentralised Multi level Planning – Principles and Practice, Concept Publishing Company, New Delhi

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper- 1	10
b)	Test Paper-2	
c)	Assignment- Project Report	20
d)	Seminar	10

e)	Book/ Article Review	
f)	Viva-Voce	10
g)	Field Report	
Total		**100**

KU07DSCGEO402 FLUVIAL AND COASTAL GEOMORPHOLOGY

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VII	DSC	400-499	KU7DSCGEO402		4	60
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE(Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

This course integrates principles of geomorphology with practical applications in studying fluvial process and coastal zone management. Geomorphic processes and landforms play a crucial role in shaping coastal environments, influencing both natural and human-induced changes. It will explore the dynamic interactions between land, river, sea, and human activities, gaining insights into sustainable coastal management practices.

Course Pre requisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains

1	It involves the practical application of principles and concepts from geomorphology to address real-world issues related to landforms, landscapes, and their dynamics	A
2	Understanding fundamental concepts of coastal geomorphology	U
3	Apply basic techniques from global to regional level and to identify the problems of coastal area	A

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓		✓				
CO 2	✓	✓				✓	
CO 3				✓			✓

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Introduction to Fluvial System**	14
	1	Drainage Basin: Network Characteristics (Numbers, Lengths, and Orders of Stream Channels), Morphology, Phases of drainage network development, Drainage modification and rearrangement	
	2	Fluvial System- input, output and variables;	
	3	Flow Regime and Sediment Sources	
	4	Channel form and process	
2		**Channel Morphology and River Management**	14
	1	Drainage Pattern Evolution	
	2	Channel Change with time	
	3	River management and restoration	
	4	Climate change and river processes	
		Coastal morphology and processes	

3	1	Definition of coastal zone and related nomenclature. Classification of coasts and shore: submerged and emerged coasts, classification of coasts by Johnson and Shepard	14
	2	Factors influencing coastal morphology and processes; Sea level fluctuations and changes; Wave processes–sediment transportation	
	3	Processes and mechanism of marine erosion and resultant landforms.	
	4	Depositional landforms: Origin, classification and distribution.(Sandy and muddy shores- beaches and beach ridge, barriers spit and bar; mudflats and marshes (salt and tidal), formation of estuaries and mangrove swamps, coastal sand dunes and deltas.	
4	**Geomorphology for costal engineering and management**		14
	1	Shoreline change mechanism, rates and causes. Structural control of shore zone morphology	
	2	Coastal zone management: Coastal regulations with special reference to India	
	3	Human utilization of coasts, environmental impacts, and management: Navigation, mining, fishing and fish- -processing, off-shore oil exploitation, reclamation and tourism	
	4	Coastal engineering and its impacts: Ports and harbors, measures for prevention of erosion and sedimentation.	
5	**Teacher Specific Module**		
	• *Conduct a field study and prepare report on coastal landforms and processes.* • *Analyse the shoreline changes and coastal morpho dynamics of a nearby region. (apply DSAS)* • *Examine the state of coastal protection measures through field visit.*		4

Essential Readings:

1. BloomA.L.(2012) Geomorphology. Rawat Publication, Jaipur
2. Hugget,R.J.(2017) Fundamentals of geomorphology, Routledge Taylor & Francis, London
3. ChorleyR J(1973) Spatial Analysis in Geomorphology, Methuen, London
4. John,P(1984) An Introduction to Coastal Geomorphology.Arnold Heinemann, London.
5. Bird,E.C.F.(2000):An Introduction to Coastal Geomorphology, John Wiley and Sons Ltd. New York
6. French,P.W(1997) Coastal and Estuarine Management, Routledge, London, 1997.
7. Charlton, R. (2007). Fundamentals of fluvial geomorphology. Routledge.
8. Kondolf, G. M., & Piégay, H. (2003). Tools in Fluvial Geomorphology.
9. Leopold, L. B., Wolman, M. G., Miller, J. P., & Wohl, E. E. (2020). Fluvial processes in geomorphology. Courier Dover Publications.

Suggested Readings:

1. Strahler,A.N.andStahler,A.M. Modern Physical Geography.Wiley India,New Delhi, 2016.
2. Bryant Richard,H.Physical Geography.Rupa Publication.New Delhi,2016.
3. Wooldridge,S.W.and Morgan,R.S.The Physical Basis of Geography-An Outline of Geomorphology. Longman, London, 1959.
4. Hussain M .Physical Geography. Anmol Publication. New Delhi. 2014.
5. Shepard,F.P.andWanless,N.R.: Our changing Coastlines. Oxford University Press, 1971.
6. Clark,J.R.(1996) Coastal Zone Management Handbook,CRC Press/Lewes Publishers.
7. Carter,R.W.G.1988.Coastal Environments: An Introduction to th ePhysical, Ecological and Cultural Systems of Coastlines, Academic Press.
8. Clark,J.R.1998.CoastalSeas: The Conservation Challenge, Blackwell Science.

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment	
d)	Seminar	15
e)	Book/Article Review	
f)	Viva-Voce	
g)	Field Report	20
Total		**100**

KU07DSCGEO403 DISASTER RISK REDUCTION BASED PROJECT WORK (PRACTICAL)

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VII	DSC	400-499	KU07DSCGEO403		4	120
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE(Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
0	8	0	50	50	100	2

Course Description:

Course designed to provide students with hands-on experience in understanding, assessing, and mitigating disaster risks. This course focuses on applying theoretical knowledge to real-world scenarios through project-based learning. Students will work on projects that simulate

disaster risk reduction (DRR) and management efforts, preparing them for careers in disaster management, emergency response, and related fields.

Course Prerequisite: NIL

Course Outcomes:

CO No	Expected Outcome	Learning Domains
1	Demonstrate a solid understanding of the fundamental concepts and principles of disaster risk reduction and management.	U
2	Identify and evaluate various types of disaster risks, assess their potential impacts on communities, and utilize risk assessment tools and methodologies.	An
3	Create and implement effective disaster risk reduction strategies and preparedness plans tailored to specific hazards and community needs.	C
4	Work effectively in multidisciplinary teams to design and implement comprehensive disaster management solutions.	A
5	Integrate modern technologies, such as Geographic Information Systems (GIS), in the assessment and management of disaster risks.	E
6	Articulate disaster risk reduction strategies and management plans clearly and persuasively to diverse stakeholders, including community members, policymakers, and emergency responders.	C

****Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C)***

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓	✓				
CO 3		✓			✓		
CO 4			✓				✓
CO 5			✓	✓			
CO 6						✓	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Conceptual Basis**	20
	1	Disaster Management- Concepts: Hazard and Disaster (Classification), Risk, Vulnerability, Disaster Management, Disaster Risk Reduction, Resilience	
	2	Disaster Management Cycle	
	3	Community Based Disaster Management	
	4	HRVC Analysis and Mapping	
2		**Natural Disasters: Hydrological and Mass-Movement Hazards**	30
	1	Flood: Causes, Impact, Distribution and Mapping	
	2	Drought: Causes, Impact, Distribution and Mapping	
	3	Coastal Erosion: Causes, Impact, Distribution and Mapping	
	4	Landslide: Causes, Impact, Distribution and Mapping	
3		**Natural Disasters: Tectonic and Meteorological Hazards**	30
	1	Earthquake: Causes, Impact, Distribution and Mapping	
	2	Tsunami: Causes, Impact, Distribution and Mapping	
	33	Cyclone: Causes, Impact, Distribution and Mapping	
	4	Heat Waves: Causes, Impact, Distribution and Mapping	
4		**Human Made and Biological Hazards**	30
	1	Fires: Causes, Impact, Distribution and Mapping	
	2	Industrial: Causes, Impact, Distribution and Mapping	
	3	Nuclear: Causes, Impact, Distribution and Mapping	
	4	Epidemic: Causes, Impact, Distribution and Mapping	
		Teacher Specific Module	
	Directions		

5	• Project 1- it should be field-based case study. Conduct a field survey for a duration not exceeding 10 days to a locality recently affected by any of the hazards covered in the syllabus. Map disaster risk and local communities mitigation measures. • Project 2- it should be local / college-based- e.g. Preparation of fire evacuation map. • Project 3- Prepare a CBDM Plan for any of the locality chosen for Project 1 and 2. • Project 4- Conduct a Hazard, Risk, Vulnerability and Capacity Analysis (HRVC) of any selected hazard for a state of interest. The analysis should be at district level using secondary data sources. • Project 5- Prepare a Disaster Susceptibility Map for an area of your interest using remote sensing data.	10

Essential Readings:

1. Coppola, D. P. (2006). Introduction to international disaster management. Elsevier.
2. Fuchs, S., & Thaler, T. (Eds.). (2018). Vulnerability and Resilience to Natural Hazards. Cambridge University Press.
3. Kapur ,Anu(2010). Vulnerable India: A Geographical Study Of Disasters. Sage Publications.
4. Singh, J. (2007). Disaster Management: Future Challenges and Opportunities. IK International Pvt. Ltd, New Delhi.
5. Smith, Keith (2013). Environmental Hazards: Assessing risk and reducing disasters
6. Wisner, B., Blaikie P et al. (2004). At Risk: Natural Hazards, People's Vulnerability and Disasters. Routledge Taylor and Francis Group.

Suggested Readings:

1. Government of India. (2011). Disaster Management in India. Delhi, India: Ministry of Home Affairs.
2. Government of India. (2008). Vulnerability Atlas of India. New Delhi, India: Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India
3. Modh, S. (2010). Managing Natural Disaster: Hydrological, Marine and Geological Disasters. Delhi, India: Macmillan.
4. Ramkumar, M. (2009). Geological Hazards: Causes, Consequences and Methods of Containment. New Delhi, India: New India Publishing Agency.
5. Stoltman, J.P., et al. (2004). International Perspectives on Natural Disasters. Dordrecht, the Netherlands: Kluwer Academic Publications.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	10
b)	Test Paper - 2	
c)	Practical Record File	25
d)	Seminar	
e)	Book/Article Review	
f)	Viva-Voce	

g)	Field Report	15
Total		**100**

KU07DSEGEO401 SOIL GEOGRAPHY

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VII	DSE	400-499	KU07DSEGEO401		4	60
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

This course provides an in-depth exploration of soil geography, emphasizing its formation, classification, properties, and management. It covers fundamental soil processes, the role of environmental factors in soil development, and regional soil characteristics. The course also examines soil resource utilization, degradation, and conservation strategies, equipping students with the theoretical and applied knowledge required for sustainable soil management.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand fundamental concepts of soil geography	U
2	Apply soil classification and analysis techniques	A
3	Analyze soil properties and their spatial patterns	An
4	Evaluate soil resource management strategies	E

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓			✓		
CO 3		✓	✓				
CO 4			✓			✓	✓

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Basics of Soil Geography**	12
	1	Definition, Nature and Scope of Soil Geography	
	2	History of Soil Geography and Pedology	
	3	Significance of Soil Geography	
2		**Soils: Formation and Properties**	16
	1	Jenny's Factorial Model of Soil Formation: Parent Material, Biotic, Climatic, Relief and Time factor.	
	2	Process of Soil Formation: Physical, Biotic and Chemical.	
	3	Physical Properties of Soils: Morphology, Texture, Structure, Water, Air and Temperature.	
	4	Chemical Properties of Soils: PH , Organic Matter, NPK (Nitrogen, Phosphorous and Potassium).	
3		**Characteristics, Classifications, Distribution**	14
	1	Soil water balance and Soil Profile	
	2	Soil Analysis: Saline and Alkaline, Vermicomposting Process	
	3	Genetic Classification of Soils- USDA Soil Taxonomy	
	4	ICAR Classification and Distribution of Major Soils in India	

4	**Soil Resource Management**		14
	1	Utilization of soil resource	
	2	Soil Degradation: Concept, Causes, consequences	
	3	Soil erosion, estimation of soil losses	
	4	Treatment and management of soil resource	
5	**Teacher Specific Module**		
	Directions		
	Practical Exercise: • *Draw Soil Profile of local area* • *Calculate soil properties with soil meter: pH, light, moisture* • *Calculate NPK soil properties of local area.*		4

Essential Readings:

1. Backman, H.O and Brady, N.C.(1960.)The Nature and Properties of Soils, Mc Millan NewYork.
2. Bennet, Hugh H.: Soil Conservation, McGraw Hill, New York.
3. Bunting, B.T.(1973) The Geography of Soils, Hutchinson, London.
4. Clarke G.R.(1957) Study of the Soil in the Field, Oxford University Press, Oxford.
5. Daji, J. A., (1970): A Text Book of Soil Science, Asia Publishing House, Londaon.
6. Foth H.D. and Turk, L.M.(9172) Fundamentals of Soil science, John Wiley, New York. 8.
7. Govinda Rajan, S.V. and Gopala Rao, H.G.(9178) Studies on Soils of India Vikas, New Delhi.
8. Morgan, R. P. C., (1995): Soil Erosion and Conservation, 2nd edition, Longman, London.
9. Plaster, E. J., (2009): Soil Science and Management, Cengage Learning, Boston.
10. Raychoudhuri, S.P., (1958): Soils of India, ICAR, New Delhi.
11. Russell, Sir Edward J.:(1961) Soil Conditions and Plant Growth, Wiley, New York.
12. Sarkar, D., (2003): Fundamentals and Applications of Pedology, Kalyani Publishers, New Delhi.

Suggested Readings:

1. Chairas, D. D., Reganold, J. P., and Owen, O. S., (2002): National Resource Conservation and Management for a Sustainable Feture, 8th edition, Prentice Hall, Englewood Cliffs.
2. Mathur, Neeru, (2012): Soils, Rajat Publications, New Delhi-02 (India).
3. Mc. Bride, M.B.(1999) Environmental Chemistry of Soils, Oxford University Press, New York.
4. Nye, P.H. and Greene, D.J.(1960)The Soil under Shifting Cultivation Commonwealth Bureau of Soil Science, Technical Communication, No. 51; Harpender, England.
5. Sehgal, J., (1996): Pedology: Concepts and Applications, Kalyani Publishers, New Delhi.

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper- 1	15
b)	Test Paper-2	
c)	Assignment	
d)	Seminar	15
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	20
Total		**100**

KU07DSEGEO402 GEO-STATISTICS FOR ADVANCED RESEARCH

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VII	DSC	400-499	KU07DSEGEO402		4	75
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	0	50	50	100	2

Course Description:

In a time where every decision is data driven, immense opportunities rest with academia to explore, assess the real ground situations its trajectories and predictions and way forward. The course just meant to do the same, and in process equip the students with the latest in the segment of data analysis in a geographical perspective.

Course Prerequisite: Basic statistics knowledge at plus two level.

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Introduce basic idea of Geo-statistics	U
2	Demonstrate how Data analytical skills are used in domain of Geography.	An

3	Awareness about latest and tested statistical methods and its application.	A
4	Equipping the students with quantitative skills for advanced research in geography	C

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Introduction to Geo-Statistics**	15
	1	Scope and significance of Geo-Statistics in research	
	2	**Application of Univariate Statistics**:. Measures tools of Location and Spread. Univariate Plots: Histogram, Probability Density Function (PDF), Cumulative Density Function (CDF). Types of Distribution: Parametric: Normal (Gaussian), Log-Normal, Non-Parametric.	
	3	**Application of Bivariate Statistics**: Bivariate Data Display: Scatterplot or Cross plot, Bivariate Measures (Covariance, Correlation Coefficient). Bi-variate & Multiple correlation and regression,	
	4	Correlation analysis Scatter Diagram & Residual mapping, T-test, Z-Score, Root Mean Square Error, Principal Component analysis.	
2		**Characterization of Spatial process**	20
	1	**Surface Modelling:1** Spatial autocorrelation, Role of Interpolation, Methods of Interpolation – Global and Local Deterministic Methods.	
	2	**Surface Modelling:2** Moving Averages, Inverse Distance Weighted Interpolation, Thiessen polygons, Optimal Interpolation using Geo-statistics	
	3	**Variogram and covariance.** Understanding of semivariogram: Components, types and functions. **Variogram and its use for Interpolation**, Interpolation by Kriging – Ordinary Kriging, Block Kriging, Non-Linear Kriging, Stratified Kriging, Co-Kriging, Universal Kriging, Probabilistic Kriging	
		Introducing Statistical Software	
	1	SPSS Package or R	
	2	Comparison between Excel and SPSS Package/ R	

3	3	Comparison between SPSS and R software	10
	4	Geo-statistics into GIS	
4	**Use of Factor and cluster analysis in geographical research**		20
	1	**Factor analysis.1** Introduction and conceptual framework Factor Analysis using SPSS and Arc-Gis/ Q-GIS	
	2	**Factor analysis.2** Assumptions and axioms Factor Analysis using SPSS and Arc-Gis/ Q-GIS	
	3	**Cluster analysis. 1** Introduction and conceptual framework Cluster anlysis using Arc Gis/Q-GIS	
	4	**Cluster analysis. 2** Assumptions and axioms Cluster anlysis using Arc Gis/Q-GIS	
5	**Geostatistics for Disaster Management:**		
	Landslide Susceptibility Modeling - Bi-Variate Statistical Methods: Probabilistic Likelihood Analysis (Frequency Ratio, Information Value Method, Weights of Evidence Method. Multivariant Methods: Multiple logical Regression, Discriminant analysis.		10

Essential Readings:

1. SALKIND N J and FREY B B. *Statistics for Those Who Think They Hate Statistics*. 7th ed. Sage Publishers, 2019 ISBN: 978-1-5443-9339-1.
2. WEBSTER, R. and M. A. OLIVER. *Geostatistics for environmental scientists.* 2nd ed. Chichester: John Wiley & Sons, 2007, xii, 315. ISBN 9780470028582.
3. DE SMITH, Michael John, Michael F. GOODCHILD and Paul LONGLEY. *Geospatial analysis : a comprehensive guide to principles, techniques and software tools*. 2nd ed. Leicester: Metador, 2007, xxii, 491. ISBN 9781906221980.
4. BORROUGH, P.A., McDONNELL, R.,A (1988): Principles of Geographical Information Systems. Oxford University Press, Oxford, 333s.
5. MCKILLUP, Steve and M. Darby DYAR. *Geostatistics explained : an introductory guide for earth scientists*. 1st pub. Cambridge: Cambridge University Press, 2010, xvi, 396. ISBN 9780521746564.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper- 1	15
b)	Test Paper-2	
c)	Assignment/Practical File	25
d)	Seminar	
e)	Book/ Article Review	
f)	Viva-Voce	10

g)	Field Report	
Total		**100**

KU07DSEGEO403 GEOGRAPHY OF HEALTH AND WELLBEING

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VII	DSC	400-499	KU07DSEGEO403		4	60
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE(Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

This course explores the intricate relationship between human and environmental health- how people interact with their physical and social environment to promote health and wellbeing or to increase their vulnerability to disease and/or illness. It elucidates the profound influence of environmental conditions, socio-economic factors, and spatial disparities on health status. The approach taken in this course will focus on providing a comprehensive understanding of the spatial dimensions of health, the social and natural determinants of health, role of governmental organizations and the pivotal role of the environment in shaping health and wellbeing. geographical scales in health care systems and access, health patterns and spatial analysis as well as the handling of population data is also part of the course.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	To equip students with the tools to analyze health issues from a geographical perspective, with applications in fields such as public health, urban planning, environmental studies and policy-making.	An

2	To outline the developing role of geography in the theoretical and practice-based issues in the areas of health and healthcare	E
3	To comprehend the spatial patterns of diseases and health care provisions as well as the influence of place and location on human health	U

**Remember(R), Understand(U), Apply(A), Analyse(An) ,Evaluate(E), Create(C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓	✓					
CO 2			✓				
CO 3		✓				✓	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Introduction**	14
	1	Nature, scope, and significance of Geography of Health	
	2	Approaches- ecological, social ,and spatial approaches	
	3	Health indices	
	4	Sequential development of health geography-methods and techniques.	
		Physical and social environment in public health	
	1	Geographical determinants of Human health-physical, social, economic, and environmental factors.	
	2	Man, and environment relationship, environment and public health	

2	3	Emerging environmental issues, organic and inorganic pollutants, effects of quality of air, water, and soil in different environs on health, the impact of climate change, environmental management and planning-national and international policies, programs, and legislation.	14
	4	Social environment and public health – population dynamics and poverty, Gender equity in health; migration and health, socio-cultural and developmental status, urban health, the role of lifestyle, regional disparity, role of health care services.	
3		**Diseases and healthcare systems**	14
	1	Diseases and mitigation –types of diseases - communicable and non-communicable, occupational, deficiency, infection, pollution diseases. WHO classification of diseases	
	2	Diseases Diffusion -factors, causes and type, Epidemiology and geography, Epidemiological transition theory of epidemiological transition (Omran theory), patterns of global distribution of major diseases.	
	3	Health care systems and planning-concept and significance of international and national models and organizations	
	4	Structure and evolution of health care system in India, geographical evaluationofhealthcareservicesandpoliciesinIndiawithrelevantcase studies, Geography of urban versus rural health in India.	
4		**Data and techniques**	14
	1	Handling of physical and population data in health, spatial analysis, and interpolation of data	
	2	GIS techniques in disease mapping, mapping of health care systems and their accessibility	
	3	Statistical interpretation of health indicators, formulation of environmental and public health management policies and practices.	
	4	Data modeling	
5		**Teacher Specific Module**	
		Directions	
		Practice GIS application in disease mapping and health care planning Mini project on role of social environment in public health	4

Essential Readings:

1. Misra,R.P.2007 .Geography of Health: A Treatise on Geography of Life and Health in India, Concept Publishing Company, New Delhi.
2. Journal of Health and Social science, The scientific Journal of SIPISS,ISSN2499 2240. Journal of Health science,ISSN2232-

7576(Print)ISSN1986-8049(Online)
3. Savindra Singh (2008) Environmental Geography, Prayag Pusthak Bhavan, Allahabad. https://onlinelibrary.wiley.com/doi/abs/10.1002/9781118410868.wbehibs420
4. Anthamatten,P.andHazen,H.2011.An introduction to the Geography of Health, Routledge, New York
5. Gatrell, A.C. and Elliott, S.J. 2015. Geographies of Health: An Introduction. 3rd edition, Wiley- Blackwell, Oxford

Suggested Readings:

1. Ashraf,S.W.A., Agriculture, Environment and Health,Concept Pub.,New Delhi.
2. Banerjee,B and Hazra J.,Geo-Ecology of Cholera in West Bengal,Univ of Calcutta, 1980.
3. Chatterjee Mera, Implementing Health Policy, Centre for Policy Research, New Delhi,1988.
4. Cliff,A.&Stewart,L.,(eds.),Atlas of Diseases distribution ,Basil Blackwell, Oxford, 1989.
5. Hazra,J.,(eds.),HealthCare Planning in Developing Centres,Unv of Culcutta, 1997.
6. Learmonth,A.T.A., Patterns of Diseases and Hunger–A Study in Medical Geography, David & Charles, Victoria, 1978.
7. May,J.M., EcologyandHumanDiseases,M.D.Pub.NewYork,1959.
8. Mc.Glashan.N.D.,Medical Geography,Methuen,London,1972.
9. Misra,R.P.,Medical Geography of India, National Book.Inst, India,NewDelhi.
10. Rais,AandLearmonth,A.T.A.,Geomorphic aspect of health and diseases in India.
11. Stamp,L.D.,The Geography of Life and Death,Cornell Univ.Ithaca,1964.
12. Aikat,B.K.(1985)Tropical diseases in India,Arnold Meinemann,Delhi,1st Edition
13. Akhtar Rais (1990), Environmental population and health problems, Ashish Publishers Home, New Delhi.

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment	20
d)	Seminar	15
e)	Book/Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		**100**

KU07DSEGEO404 SPATIAL THEORIES

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VII	DSE	400-499	KU07DSEGEO404		4	60
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE(Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

This course provides an in-depth exploration of spatial theories that have significantly influenced geographical thought. Students will engage with foundational concepts such as space, place, and scale while critically examining the theoretical contributions of key thinkers in human geography. The course covers various theoretical perspectives, including positivism, humanism, phenomenology, Marxism, feminism, postmodernism, postcolonialism, and queer theory. Additionally, students will analyze contemporary debates surrounding the production, consumption, and representation of space, fostering a nuanced understanding of spatial processes in society.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Analyze spatial theories and their foundations	An
2	Evaluate the production, consumption, and representation of space	E
3	Understand key thinkers and critical perspectives on space	U

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓	✓					
CO 2			✓				
CO 3		✓				✓	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Thinking About Space**	14
	1	Space, Place and Scale- Setting the Foundation	
	2	Theoretical foundation: Positivism, Humanism and Phenomenology, Marxism, Feminism, Post-modernism, Post-colonialism, and Queer Theory	
	3	Lifeworld of Key Thinkers of Space: Henri Lefebvre, David Harvey, Anne Buttimer, Foucault, Doreen Massey, Deleuze and Gauttari, Edward Said, Homi Baba	
2		**The Production of Space**	14
	1	Perceived, conceived and lived space; First, Second and Third Space, Utopia and Heterotopia	
	2	Capital and the production of space: Harvey and Soja	
	3	Race, Ethnicity and Caste and the production of space	
	4	Gender and Sexuality and the production of space: Gillian Rose, McDowell, Gill Valentine, Brown	
3		**Consumption of Space**	14
	1	Availability and accessibility to space	
	2	Caste and Class and the consumption of space	
	3	Geder and Sexuality and the consumption of space	
	4	Religion and ethnicity and the consumption of space	
4		**Representation of Space**	14
	1	Location Theories- Idea of space, place and location in classical location theories	
	2	Structure and Agency in theorizing space; Relational space	
	3	Non-representational theory and lived geographies	
	4	More-than-human geographies	
	Teacher Specific Module		

5	*Directions*	
	Literature Seminar on following themes: • Geography as Sptial Science • Humanistic geography and Phenomenological Conceptions of Space • Critical Conceptions of Space	4

Essential Readings:

1. Nayak, A., & Jeffrey, A. (2013). Geographical thought: An introduction to ideas in human geography. Routledge.
2. Cresswell, T. (2024). Geographic thought: A critical introduction. John Wiley & Sons.
3. Hubbard, P., & Kitchin, R. (Eds.). (2010). Key thinkers on space and place. Sage.
4. Harvey, D. (2006). Spaces of global capitalism. Verso.
5. Henri, L., & Donald, N. S. (1991). The production of space.
6. Gregory, D., Johnston, R., Pratt, G., Watts, M., & Whatmore, S. (Eds.). (2009). The dictionary of human geography. John Wiley & Sons.
7. Deleuze, G. (1987). A thousand plateaus: Capitalism and schizophrenia. U of Minnesota P.
8. Cresswell, T. (2014). Place: an introduction. John Wiley & Sons.
9. Barnes, T. J., & Sheppard, E. (Eds.). (2019). Spatial histories of radical geography: North America and beyond. John Wiley & Sons.
10. Gregory, D. (1978). Ideology, science, and human geography.
11. Women and Geography Study Group. (2014). Feminist geographies: Explorations in diversity and difference. Routledge.
12. Bell, D., & Valentine, G. (2003). Mapping desire: Geog sexuality. Routledge.
13. Edward, S. (2003). Orientalism: Western conceptions of the Orient. Penguin Books Limited.
14. Elden, S., & Crampton, J. W. (Eds.). (2012). Space, knowledge and power: Foucault and geography. Ashgate Publishing, Ltd..
15. Massey, D. B. (2005). For space.

Suggested Readings:

1. Strohmayer, U., & Benko, G. (Eds.). (1997). Space and social theory: interpreting modernity and postmodernity. Blackwell.
2. Rankin, W. (2019). After the map: Cartography, navigation, and the transformation of territory in the twentieth century. University of Chicago Press.
3. Anderson, B. (2016). Taking-place: Non-representational theories and geography. Routledge.
4. Cresswell, T. J. (1992). In place/out of place: Geography, ideology and transgression. The University of Wisconsin-Madison.
5. Johnston, L., & Longhurst, R. (2010). Space, place, and sex: Geographies of sexualities. Rowman & Littlefield.
6. Browne, K., Lim, J., & Brown, G. (Eds.). (2009). Geographies of sexualities: Theory, practices and politics. Ashgate Publishing, Ltd..
7. Whatmore, S. (2002). Hybrid geographies: Natures cultures spaces.
8. Crang, M., & Thrift, N. (Eds.). (2000). Thinking space (Vol. 9). London: Routledge.

Assessment Rubrics:

Evaluation Type	Marks
End Semester Evaluation	**50**
Continuous Evaluation	**50**
a) Test Paper - 1	15
b) Test Paper - 2	
c) Assignment	15
d) Seminar	20
e) Book/Article Review	
f) Viva-Voce	
g) Field Report	
Total	**100**

KU08DSCGEO401 GEOSPATIAL MODELLING (PRACTICAL)

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VIII	DSC	400-499	KU08DSCGEO401		4	120
Learning Approach (Hours/Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
0	8	0	50	50	100	2

Course Description:

This course is designed to provide students with hands-on experience in applying advanced geospatial techniques to address complex spatial challenges. Through a combination of theoretical understanding and practical exercises, students will explore cutting-edge tools in spatial analysis, remote sensing, and Geographic Information Systems (GIS). Emphasis will be placed on real-world applications, enabling students to develop practical skills that are essential for careers in fields such as environmental science, urban planning, and geospatial technology.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Apply advanced spatial analysis techniques to analyze and interpret complex spatial patterns and relationships.	A
2	Process and interpret various types of remote sensing data for accurate land cover classification and change detection.	An
3	Create and analyze spatial models using GIS tools to simulate and understand complex spatial processes.	C
4	Develop and present interactive maps using web GIS technologies to effectively communicate geospatial information.	C

****Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create (C)***

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓			✓			
CO 2				✓	✓		
CO 3				✓	✓		✓
CO 4				✓	✓	✓	
CO 5							

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
	1	Introduction to Advanced Geospatial Techniques	
	2	Spatial Data Management	20
1	3	GIS Modeling	

	4	Integrating Geospatial Techniques	
2	1	Raster surface preparation using various interpolation methods	30
	2	Land use Mapping	
	3	Urban land use mapping	
	4	Suitable site analysis	
3			30
	1	Hydrological analysis	
	2	Density analysis	
	3	Network analysis	
	4	Weighted overlay analysis techniques	
4			30
	1	Mobile GIS	
	2	Web GIS	
	3	3D data preparation	
	4	Build 3D earth model	
5	**Teacher Specific Module**		
	Directions		
	A project file consisting of 5 exercises on using any GIS Software on above mentioned themes.		10

Essential Readings:

1. Maguire, D., M. Batty, and M. Goodchild. 2005. GIS, spatial analysis, and modeling. ESRI Press (G70.212 .G584 2005)
2. Goodchild, M., B.Parke, and L.Steyaert. 1993. Environmental Modeling with GIS. Oxford University Press. (TD153 .E58 1993)
3. Zeiler, M. 2010. Modeling Our World: The ESRI Guide to Geodatabase Design. Second Ed. ESRI Press, Redlands, California
4. M. Anji Reddy (2008) Textbook of Remote sensing and Geographical information systems, BS Publications, Hyderabad
5. Basudeb Bhatta (2021) Remote sensing and GIS, Oxford University Press, New Delhi Ian
6. Heywood et.al (2002) An Introduction to Geographical Information System, Pearson Education Private Limited, Delhi.
7. Kang Tsung Chang (2008) Introduction to Geographic Information Systems, Tata Mc Graw Hill Publishing Company Ltd, New Delhi.
8. Loo C P and Albert K W Y (2004) Concepts and Techniques of Geographic Information Systems, Prentice Hall of India, New Delhi.

Suggested Readings:

1. Kang Tsung Chang (2008) Introduction to Geographic Information Systems, Tata Mc Graw Hill Publishing Company Ltd, New Delhi.
2. Loo C P and Albert K W Y (2004) Concepts and Techniques of Geographic Information Systems, Prentice Hall of India, New Delhi.
3. Verbyla D. L. (2003) Practical GIS analysis. Taylor & Francis, London, 305
4. Mitchell, Andy (2001). ESRI Guide to GIS Analysis, Volume 1. Geographic Patterns & Relationships. ESRI Press
5. Lillisand, T.M. And P.W.Kiefer, 1986: Remote Sensing And Image Interpretation,John Wiley & Sons, New York.
6. Michael F. Goodchild (2009) Geographic information systems and science: today and tomorrow, Annals of GIS, 15:1, 3-9, DOI: 10.1080/19475680903250715.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper-1	15
b)	Test Paper-2	
c)	Assignment	
d)	Seminar	
e)	Book/Article Review	
f)	Viva-Voce	10
g)	Record File	25
Total		**100**

KU08DSCGEO402 GENDER AND DEVELOPMENT

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VIII	DSC	400-499	KU08DSCGEO402		4	60
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

The course equip students to explore how gender identities, roles, and inequalities intersect with development processes at local, national, and global levels. The course will critically evaluate existing frameworks, policies, and interventions aimed at promoting gender equality and women's empowerment within the development agenda. Through case studies and discussions, students will assess the differential impacts of development initiatives on individuals and communities based on gender, thus it further highlights the significance of incorporating gender perspectives in planning, implementation, and evaluation. Overall, the course aims to prepare students with the analytical tools and knowledge needed to address gender inequalities and promote inclusive and sustainable development outcomes.

Course Pre requisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Introduce basic idea of development through gender lens	U
2	Awareness about the role of gender in determining access to social welfare measures	An
3	Introduce methods and measures of gender development	A

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓				✓	
CO 3					✓		✓

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Geography of Gender and Development**	14
	1	Nature and Scope of Gender Geographies	
	2	Sex and Gender, gender roles, gender relations, gender neutrality	
	3	LGBTQIA+	
	4	Contemporary trends in Geography of Gender	
2		**Measures of Gender and Development**	14
	1	Gender and Social Well Being: Trends and patterns of child sex ratio, sex ratio, female literacy, maternal mortality, Crime against women and electoral participation.	
	2	Gender Transformative Programmes: Women in Development (WID), Women and Development (WAD) Gender and Development (GAD)	
	3	Measures of Gender Empowerment: Gender Development Index (GDI) and Gender Empowerment Measure (GEM)	
3		**Gendered Work and Livelihoods**	14
	1	Gender division of work, Productive paid work and Reproductive work	
	2	Trends and differentials of gendered indicators of women's work participation in rural and urban areas of Global North and Global	
	3	Invisible work and double burdens	
4		**Gender and Contemporary Global Concerns**	14
	1	Gendered impacts of hazards and disasters	
	2	Gender and climate change	
	3	Gendered violence and livelihood loss	

	4	Need for a resilient communities through women's participation	
5	**Teacher Specific Module**		
	Directions		
	Write research project on any subtheme from the module 1-4. The research paper may use secondary data, however the analysis required to be original in nature.		4

Essential Readings:

1. Coles,A., LeslieG.,and JanetM.,(eds.)(2015) The Routledge Handbook of Gender and Development. Routledge.
2. Evans,M.and WilliamsC.(2013).Gender: The Key Concepts. Routledge.
3. Massey,D.(1994).Space, Place and Gender.University of Minnesota Press, Minneapolis
4. Moghadam,V.,etal.(2011) The Women,Gender and Development Reader. Bloomsbury Publishing.
5. Momsen,J.(2019).Gender and Development. Routledge.
6. Moser,C.(2012) Gender planning and development: Theory, practice and training. Routledge.
7. Spary,C.,(2019) Gender ,Development, and the State in India. Routledge.
8. Visvanathan, Nalini, Lynne Duggan, Nan Wiegersma, and Laurie Nisonoff.(2011) The Women, Gender and Development Reader. Halifax, Canada: Fernwood Publishing.

Suggested Readings:

1. Domosh,M.,Seager,J.,& Buck,B.(2001).Putting women in place : Feminist geographers make sense of the world (p. 74). New York: Guilford Press.
2. Mc Dowell, L.(1999).Gender, identity and place: Understanding feminist geographies. U of Minnesota Press.
3. Rose,G.(1993).Feminism & geography:The limits of geographical knowledge.U of Minnesota Press.
4. Raju,S.,& Lahiri-Dutt,K.(Eds.).(2011).Doing gender, doing geography: emerging research in India.
5. Bell,D.,& Valentine,G.(2003).Mapping desire: Geog sexuality. Routledge.

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment	20
d)	Seminar	15
e)	Book/Article Review	
f)	Viva-Voce	

g)	Field Report	
Total		**100**

KU08DSCGEO403 ADVANCED CLIMATOLOGY AND CLIMATE CHANGE

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VIII	DSC	400-499	KU08DSCGEO403		4	60
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

This course is to provide students with adequate analytical tools to evaluate the complexity of climate change as a problem that includes scientific, social, cultural, economic, technological and political elements. Earth has a complex, interconnected system of processes that control the state of the climate. This course explores the science of climate change, perhaps the defining environmental issue of the 21st century. Students will learn how the climate system works; what factors cause climate to change across different time scales and how those factors interact; how climate has changed in the past; how scientists use models, observations and theory to make predictions about future climate; and the possible consequences of climate change for our planet. Finally, the course looks at the connection between human activity and the current warming trend and considers some of the potential social, economic and environmental consequences of climate change

Course Pre requisite : NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	To understand fundamental physical processes underlying climate variability and climate change	U
2	To explain and evaluate the evidence for human-caused climate change, in the context of historical climate change, as well as the relevant scientific uncertainties	A
3	Explain the impacts of climate change on human well-being and the natural world, and evaluate means by which these impacts can be reduced(adaptation).	An

4	To analyse the climatic data and make models on climate change and its interpretation for accurate weather forecasting	E

**Remember(R), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓	✓					
CO 2	✓					✓	
CO 3			✓				✓
CO 4				✓	✓	✓	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Stability and Air Mass**	14
	1	Stability and instability, Adiabatic cooling of atmosphere; Cloud Development	
	2	Air Masses and Fronts; Cyclones– origin, distribution and associated weather.	
	3	Monsoon, Regional aspects of Indian Monsoon, ENSO, IOD, Jet Stream, Polar Vertex.	
	4	Thunder storms, Tornadoes, Cloud Bursts, Squalls, Downburst, Hail storm Flash flood and Derecho.	
2		**Climate Measurement and Classification**	14
	1	Climate classifications - Koeppen, Trewartha and Thornthwaite, Major climates of the world-Tropical Rain Forest, Mediterranean, Tropical Deserts and Tundra Climates	
	2	Applied climatology-Weather station, Weather industry, Bio- climatology	
	3	Analysis of climatic data, their interpretation, Forecasting and tracking of Extreme Weather Phenomenon-numerical weather prediction, process and limitations	
	4	Empirical orthogonal function, Exceedance probability and relative operating characteristics (ROC), regression method, use of general circulation modals for weather prediction	

3	**Climate Change- Physical Science Basis**		
	1	Science of Climate Change, Theories on climate change, Climatic changes in the past, present trends of climate change; Role of IPCC	
	2	Evidence of Climate Change: Earth Climate system, Radiation Budget, Greenhouse gases, Global warming, Extreme events- sea level rise, cyclones, drought, flood, Monsoon Variability, urban heat island	14
	3	Causes of climate change–natural and human made	
	4	Impacts of climate change: on Natural System and Human System	
4	**Vulnerability and Adaptation**		
	1	Climate change and Vulnerability–physical, economic and social vulnerability	
	2	Climate Change Mitigation- UNFCCC and Global Initiatives	
	3	Indian initiative- National Action Plan on Climatic Change	14
	4	Climate Change Adaptation- Climate emergency, Knowledge, Technology, Society and Politics; maladaptation	
5	**Teacher Specific Module**		
	Directions		
	Conduct a workshop on any of the topics of contemporary relevance such as • Air pollution and urban environment • Climate change and coastal community • Living with climate disasters		4

Essential Readings:

1. Ahrens,C.D.,and Samson,P.(2011): ExtremeWeatherandClimate,Brooks/Cole, Belmont.
2. Dessler, A.E.,and Parson,E.A.(20 09):The Science and Politics of Global Climate Change–A Guide to the Debate, Cambridge University Press,Cambridge,190pp.
3. IPCC5thAssessment report on Climate Change :http://www.ipcc.ch/report/ar5/11.
4. IPCC6thAssessmentreportonClimateChange:https://www.ipcc.ch/assessment- report/ar6/
5. Khan,M.Z.A.,and Gangawala,S. (2011):Global Climate Change–Causes and Consequences, Rawat Publications, Jaipur, 298pp
6. Ruddiman,W.F.(2008):Earth's Climate–Past and Future,W.H.Freeman, NewYork, 388pp.
7. Adger,W.N.2006.Vulnerability, Global Environmental Change,16(3),268-281
8. Barros, Vicente R. (eds.), 2014. Climate Change 2014. Impacts, Adaptation and Vulnerability: Global and Sectoral Aspects. Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Part B; RegionalAspect),Cambridge University Press, New York.
9. Barry,R.G .and Chorley, R.J.2003.Atmosphere, Weather and Climate, Routledge, London
10. Brewster,E.N. 2010. Climate Change Adaptation: Steps for a Vulnerable Planet, New York, Nova Science
11. Critchfield,H.J. 1983.General Climatology. Prentice Hall India Ltd (2010Reprint)
12. IPCC, 2013. Climate Change 2013: The Physical Science Basis, the Fifth Assessment
13. Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner,M.Tignor,S.K.Allen,J.Boschung,A.Nauels,Y.Xia,V.BexandP.M.Midgley (eds.)]. Cambridge

University Press, Cambridge, United Kingdom and New York, NY, USA,
14. John E Hobbs,2016.Applied climatology: A study of Atmospheric Resources,Elsevier, London

Suggested Readings:

1. Emaunuel K (2018). Know about climate change. Massachusetts Institute of technology, United States.
2. Ahmad J (2013):Climate change and sustainable development in India. New century publications, New Delhi, India.
3. Tarhule Aondover (2013). Climate variability: Reginal and thematic patterns .Intech publication, Croatia.
4. Shagufta C.J (2010):Global warming and climate change. A.P.H publishing corporation, New Delhi.
5. Letcher,T.M(2009).Climate change: observed impacts on planet earth.Elsevier publications, United Kingdom.
6. Letcher,T.M (2009).Managing global warming:An interface of technology and human issues. Elsevier publications, United Kingdom.
7. Silver,J(2008).Global warming and climate change demystified. McGraw Hill Educations, New York.
8. Kumar H.D (2006):Global climate change: insights, impacts and concerns. Vistara Publishing Pvt. Ltd, New Delhi.

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper - 1	15
b)	Test Paper - 2	
c)	Assignment	15
d)	Seminar	20
e)	Book/Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		**100**

KU08DSCGEO404 WATER RESOURCE MANAGEMENT

Semester	Course Type	Course Level	Course Code		Credits	Total Hours
VII	DSC	400-499	KU08DSCGEO404		4	60
Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	0	50	50	100	2

Course Description:

Water resource management is a crucial discipline that addresses the sustainable utilization, allocation, and conservation of water resources to meet the needs of both present and future generations. This signature course provides students with a comprehensive understanding of the principles, theories, and practices involved in the management of water systems at local, regional, and global scales. Through a blend of theoretical study, case analyses, and practical applications, students will explore the complexities of water governance, policy development, and integrated water resource management.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	To appraise the significance of hydrology and to understand the complex water systems of the earth and to find solutions for water problems.	U
2	To know the water cycle and its relevance in the sustenance of water resources and to apply the water balance equation to various hydrological problems.	A

3	To analyse the nature of processes involved in surface and ground water systems.	An
4	To examine the impact of human activities on water resources and contributing to the water resource management of the area based on the analysis of hydrological data.	E

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓						
CO 2		✓			✓		
CO 3		✓	✓				
CO 4			✓			✓	✓

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**Water resource management -Conceptual basis**	14
	1	Water – The environmental, technological of societal complexities system concepts in Hydrology	
	2	Scope of WRM, Sustainable water management and sustainable water development goals (SDG6).	
	3	Hydrological Cycle; systems concepts, lumped and distributed systems, deterministic and stochastic Systems,	

	4	Global Water Balance, Human impact on the hydrological cycle,	
2	**Surface and ground water resource**		14
	1	Surface Water Systems, Drainage Basin as Geohydrological unit	
	2	Springs Darcy's Law and elementary groundwater flow equation, ground water monitoring, groundwater resource estimation	
	3	Ground water - factors affecting groundwater- aquifers and their characteristics/classification, groundwater basins,	
	4	Elementary groundwater resource estimation, ground water monitoring, groundwater recharging	
3	**WRM- issues and challenges**		14
	1	Water use conflicts, water quality and major water pollutants (points and non-point source),	
	2	Water quality criteria analysis	
	3	Flood causes and types – flood frequency analysis, flood plain zoning, estimation of flood for different frequencies, flood forecasting,	
	4	Drought- causes and types, drought assessment and monitoring	
4	**Spatial Planning in India**		14
	1	Concept and Practice of Water Management- Approaches of Surface Water Management -	
	2	Traditional Water Harvesting, Storing and Management practices of water- world and in India.	
	3	Micro and Decentralized Planning in india, Rainwater Harvesting – Significance. Artificial groundwater recharge, Wetlands Management,	
	4	Disaster management , Watershed Based Planning, Government of India and State Government Initiatives for Water Management	
5	**Teacher Specific Module**		
	Directions		
	Prepare a field report on rain water harvesting system Calculate water balance of the locality *Practice methods of Ground water estimation*		4

Essential Readings:

1. Abbas, B.M. 1982. The Ganges Water Dispute, Vikas Publishing House Pvt. Ltd., New Delhi.
2. Aggarwal, A. 1991. Floods, Floodplains and Environmental Myths, Centre for Science and Environment, New Delhi.
3. Andrew, D. W. and Trimble, S. 2004. Environmental Hydrology, 2nd Edition, Lewis Publishers, CRC Press.
4. Beek, E., Loucks, P.D. 2005. Water Resource Systems Planning and Management: An Introduction to Methods, Models and Applications, UNESCO,

Paris.
5. Bhattacharya, S.K. 1988. Urban Domestic Water Supply in Developing Countries, CBS Publishers, CR Distributors, Delhi.
6. Chow, V.T., Maidment, D.R. and Mays, W.L. (1988) Applied Hydrology, McGraw-Hill International Editions, McGraw-Hill Book Company, New York.
7. Chow V.T (2017) - Handbook of Applied Hydrology, Tata McGraw Hill, New Delhi
8. Jain, S.K., Aggarwal, P.K. and Singh, V.P. 2007. Hydrology and Water Resources of India, Springer, The Netherlands.
9. Jaya Rami Reddy (2011) A Textbook of Hydrology, University Science Press
10. Joseph Holden (2013) Water Resources-An Integrated Approach, Routledge
11. Karanth, K.R. 1988. Groundwater: Exploration, Assessment and Development, Tata- McGraw Hill, New Delhi.
12. Mahajan G. 1989. Evaluation and Development of Groundwater, Ashish Publishing House, New Delhi.

Suggested Readings:

1. Micklin, Philip, P. 1996. Man and the water cycle: Challenges for the 21st century, Geojournal, 39 (3): 285-298.
2. Mysooru R Yadupathu Putty (2013) Principles of Hydrology I.K. International, New Delhi, 2013
3. Pietro Laureano (2001) Water Conservation Techniques in Traditional Human Settlements, Copal Publishing House
4. Raghunath, H.M (1987) Groundwater, Wiley Eastern Ltd., New Delhi.
5. Raghunath H M, (2006) Hydrology Principles, Analysis and Design, New Age International

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**50**
a)	Test Paper- 1	15
b)	Test Paper-2	
c)	Assignment	
d)	Seminar	15
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	20
Total		**100**