

MSc Geography-Syllabus

(With affect from academic year 2025-2026)

DEPARTMENT OF GEOGRAPHY
SCHOOL OF EARTH SCIENCES

विभागाध्यक्ष / HEAD

भूगोल विभाग

Department of Geography

कर्नाटक केन्द्रीय विश्वविद्यालय

Central University of Karnataka

कडगंची, कलबुर्गी / Kadaganchi, Kalaburagi

Vision Statement

The Department of Geography strives to be a leader in Earth Science, focusing on the complexities of Earth-human interactions. It aspires to be a hub for quality geographical learning and practice globally, blending theory with application while embracing the maxim: "Geography is reporting and understanding everything on and inside the Earth."

Mission Statements:

MS1: Foster a deep appreciation for Geography and its relevance in understanding the world.

MS2: To equip the students with the ability to productively work with the tools and techniques on a strong base of theory and knowledge.

MS3: Enable students to apply geographic knowledge and analytical skills to address real-world challenges across diverse fields.

MS4: Cultivate a spirit of inquiry, innovation, and research to advance geographic knowledge and its societal applications.

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Qualification Descriptors (QDs)

After completion of this academic program, the students will be able to

- QD1.** Demonstrate in-depth knowledge of Geography, integrating theoretical and applied perspectives across physical, human, and geospatial sciences.
- QD2.** Effectively apply qualitative and quantitative methods in geographical research, including field surveys, spatial analysis, and statistical techniques, to generate fact-based solutions.
- QD3.** Utilize advanced tools and techniques in cartography, remote sensing, and quantitative methods for spatial analysis and decision-making.
- QD4.** Communicate geographical research effectively through written, visual, and spatial representations, ensuring clarity and socio-economic relevance.
- QD5.** Demonstrate competency in data collection, interpretation, and spatial analysis, preparing for roles in academia, industry, governance, and applied research.
- QD6.** Develop a professional and socially responsible approach to career growth, applying geographic knowledge to address real-world challenges in sustainability, urban planning, disaster management, and environmental studies.

Mapping Qualification Descriptors (QDs) with Mission Statements (MS)

	MS-1	MS-2	MS-3	MS-4
QD-1	3	-	2	-
QD-2	2	3	1	2
QD-3	-	2	3	-
QD-4	-	2	2	3
QD-5	-	2	3	-
QD-6	2	2	-	-

Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.

M.Sc. in Geography

Program Learning Outcomes (PLOs)

- PLO1.** Demonstrate advanced knowledge of **physical, human, and regional geography**, integrating theoretical and applied perspectives.
- PLO2.** Apply **qualitative and quantitative research methods**, including field surveys, spatial analysis, and statistical techniques, to investigate geographic phenomena.
- PLO3.** Utilize **cartographic GIS and remote sensing techniques** for effective spatial representation and data interpretation.
- PLO4.** Develop **critical thinking and problem-solving skills** to address environmental, social, and economic challenges through a geographical perspective.
- PLO5.** Communicate geographical research effectively through **written, oral, and visual formats** while maintaining ethical standards and contributing to real-world solutions.

**Mapping of Program Learning Outcomes (PLOs)
with Qualification Descriptors (QDs)**

	QD-1	QD-2	QD-3	QD-4	QD-5	QD-6
PLO-1	3	2	3	-	1	
PLO-2	-	-	3	-	-	2
PLO-3	2	3	-	2	-	-
PLO-4	-	3	2	3	3	-
PLO-5	-	2	-	2	3	-

Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.

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Assessment Structure

Assessment structure for theory and practical Paper

Theory Paper

- Continuous Internal Assignments: Continuous Internal Assessment includes Test, Presentation and Assignment consisting of 40 Per cent Marks of the entire Course
- End Semester Exam: Consists of written examination for 60 per cent of marks of the course.

Practical Paper

- Continuous Internal Assignments: Assessment will be done on the practical exercise records submitted by the students. Consisting of 40 Per cent Marks of the entire Course
- End Semester Exam: Consists of written examination for 60 per cent of marks of the course.

Assessment of Internship, Dissertation and field-work is based on the Report, Presentation and viva-voce 100 per cent marks of the course


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MSc Course Structure									
Paper Type	Paper Code	Paper Name	L	T	P	T	IA	ES	Total
SEMESTER-I									
Core Course	PAGTC12001	Geomorphology	3	1	0	4	40	60	100
Core Course	PAGTC12002	Climatology	3	1	0	4	40	60	100
Core Course	PAGTC12003	Oceanography and Hydrology	3	1	0	4	40	60	100
SEC	PAGTS12001	GIS	2	1	0	3	30	45	75
AECC	PAGPA12101	Survey and GNSS (Practical)	0	0	2	2	20	30	50
GE	PAGTG12301	Migration Studies	2	1	0	3	30	45	75
	PAGTG12302	Sustainable Development							
	PAGTG12303	Basics of Geoinformatics							
I Semester Total						20			500
SEMESTER-II									
Core Course	PAGTC22004	Environmental Geography and Biogeography	3	1	0	4	40	60	100
Core Course	PAGTC22005	Contemporary Geographical Thoughts	3	1	0	4	40	60	100
Core Course	PAGTC22006	Remote Sensing	3	1	0	4	40	60	100
Core Course	PAGPC12003	Cartography and Map Interpretation (Practical)	0	0	3	3	30	45	75
AECC	PAGPA22102	GIS (Practical)	0	0	2	2	20	30	50
GE	PAGTG22304	Applications of Geoinformatics	2	1	0	3	30	45	75
	PAGTG22305	Gender and Space							
	PAGTG22306	Political Geography							
II Semester Total						20			500
SEMESTER-III									
Core Course	PAGTC32007	Economic Geography	3	1	0	4	40	60	100
Core Course	PAGTC32008	Urban Geography	3	1	0	4	40	60	100
Core Course	PAGTC32009	Population Geography	3	1	0	4	40	60	100
Core Course	PAGTC32010	Research Methods and Ethics	3	1	0	4	40	60	100
AECC	PAGPA32103	Remote Sensing (Practical)	0	0	2	2	20	30	50
DSE	PAGTD32201	Quantitative Techniques (Practical)	0	0	2	2	20	30	50
III Semester Total						20			500
SEMESTER-IV									
Core Course	PAGTC42011	Geography of India	3	1	0	4	40	60	100
Core Course	PAGTC42012	Regional Planning and Development	3	1	0	4	40	60	100
DSE	PAGRD42202	Dissertation				6	60	90	150
Core Course	PAGIC42014	Internship				4	40	60	100
SEC	PAGPS42002	Field Work				2	20	30	50
IV Semester Total						20			
Programme Total						80			2000


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SEMESTER-I



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Title of the Course : **Geomorphology**
Course Code : **PAGTC12001**
L-T-P : **3 -1 -0**
Credits : **4**
Prerequisite Course / Knowledge (If any): **Basic knowledge of Physical Geography**

Course Learning Outcomes (CLOs)

By the end of the course, students will be able to:

CLO1: Remember and describe geomorphological concepts, theories, and processes shaping Earth's surface.

CLO2: Understand the interplay of processes and factors responsible for landform evolution.

CLO3: Know the applications of GIS and remote sensing tools for geomorphological analysis.

CLO4: Analyse and interpret geomorphological data and human-environment interactions.

CLO5: Evaluate geomorphic processes to solve real-world problems like hazard mitigation and resource management.

CLO6: Create independent research outputs through fieldwork and innovative solutions for geomorphic challenges.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2	-	3	2
CLO2	3	1	-	2	3
CLO3	2	3	3	2	-
CLO4	1	3	3	3	-
CLO5	-	1	-	2	3
CLO6	-	-	-	2	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

- Unit 1:** Introduction to Geomorphology: Definition, scope, evolution, recent trends and importance of geomorphology; Key concepts: Catastrophism, Uniformitarianism; Energy systems: Open, closed, steady state and dynamic equilibrium; Geomorphic thresholds and feedback mechanisms; Rocks formation and classification.
- Unit 2:** Tectonic Geomorphology: Tectonic and Structural Processes—Continental drift Theory; Plate tectonics and related geomorphological features; Structural control on landforms; classification and mechanisms of mass wasting; volcanism; seismicity and diastrophism.
- Unit 3:** Theories of Geomorphology: Landforms Development Models of W. M. Davis, Walther Penck; L. C. King and J. Hack; R.J. Chorley; Stanley Schumm and J. Brunsden & K.S. Richards.
- Unit 4:** Exogenic Processes and Landforms: Fluvial Processes—Hydrological properties of channels: Regime, velocity, Morphological properties of channels: profiles, planforms, patterns, and classification. Aeolian Processes: Aeolian processes and landforms: Erosion, transportation and Deposition; Coastal Processes: Coastal Morpho-dynamics: factors, characteristics; Processes and Formation of coastal landforms: Rhythmic beach topography, coastal dunes and deltas; Glacial Processes— Cryosphere and Glacial processes and their landforms: Erosion, Transportation and Deposition.

Essential Readings

Textbooks

- Bloom, A.L. (2004). *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*.
- Burt, T. P., Chorley, R. J., Brunsden, D., Kox, N. J. and Goudie, A. S. (2008). *The History of the Study of Landforms or the Development of Geomorphology*, The Geological Society Publishing House, London.
- Condie, Kent C., (1997). *Plate Tectonics and Crustal Evolution*, Butterworth-Heinemann, Oxford.
- Chorley, R., Schumm, S. and Sugden, D. E. (1994): *Geomorphology*, Methuen, London.
- Goudie, A. (Ed) (1990): *Geomorphological Techniques*, 2nd Edition, Allen Unwin Crow's Nest (Australia).
- Gutiérrez, Francisco and Gutiérrez, Mateo, (2016). *Landforms of the Earth: An Illustrated Guide*, Springer International Publishing, Switzerland.
- Huggett, R. J. (2011). *Fundamentals of Geomorphology*. Routledge, London.
- Kale, V. S. and Gupta, A. 2001. *Introduction to Geomorphology*, Orient Longman Ltd., Hyderabad.
- Knighton, D. (1998): *Fluvial Forms and Processes: A New Perspective*, Arnold, London.
- Mario, Panizza. 1996. *Environmental Geomorphology* by Elsevier, Amsterdam
- Ollier, C. D. 1981: *Tectonic Geomorphology*, Longman Scientific & Technical, London.
- Pethick, J. 1984. *An Introduction to Coastal Geomorphology*, Edward Arnold, London.
- Ritter, D. F., Kochel, R. C. and Miller, J. R. (2006): *Process Geomorphology*, 4th Edition, Waveland Press, N. Y.
- Selby, M. J. 1985. *An Introduction to Geomorphology*, Clarendon, Oxford.

- Thornbury, W. D. (1969): *Principles of Geomorphology*, Wiley Eastern Limited, New Delhi.
- Tinkler, (1985). *A Short History of Geomorphology*, Croom Helm Ltd., Beckenham.

Reference Books

- Roy, P. (2021). *Riverbank Erosion: A Concise and Critical Review of Scale, Approaches, Methods and Techniques*, Mahi Publications, India.
- Cook and Doorncamp. (1988): *Geomorphology in Environment Management*, London
- Faniran, A. and Jeje, L. K. (1983): *Humid Tropical Geomorphology*, Longman, London:
- Morisawa, M. (editor) 1994. *Geomorphology and Natural Hazards*, Elsevier, Amsterdam.
- Morisawa, M. 1985. *Rivers*, Longman, London.
- Newson, M. 1992. *Land Water and Development, River Basin Systems and their Sustainable Management*, Routledge, London.
- Sharma, H.S. 1987. *Tropical Geomorphology: A Morphogenetic Study of Rajasthan*, South Asia Books, Jaipur.
- Szabó, József, Dávid, Lóránt and Lóczy, Dénes (Eds) (2010). *Anthropogenic Geomorphology: A Guide to Man-Made Landforms*, Springer Science+Business Media, Hungary.
- Thomas, D.S.G.(Editor) (2008): *Arid Zone Geomorphology: Process, Form and Change in Drylands*, 2nd Edition, Wiley, Chichester.

Journals

- *Earth Surface Processes and Landforms* (Wiley).
- *Geomorphology* (Elsevier).
- *Physical Geography*



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Title of the Course : **Climatology**
Course Code : **PAGTC12002**
L-T-P : **3 -1 -0**
Credits : **4**

Prerequisite Course / Knowledge (If any): Basic knowledge of Physical Geography

Course Learning Outcomes (CLOs)

By the end of the course, students will:

CLO1: Understand the fundamental concepts of climatology, including atmospheric composition, solar radiation, and the Earth's energy balance. (Remembering)

CLO2: Explain the hydrological cycle, atmospheric moisture processes, and precipitation mechanisms. (Understanding)

CLO3: Understand atmospheric circulation patterns, including local and planetary-scale wind systems. (Remembering)

CLO4: Evaluate the formation and impacts of cyclones, monsoons, and extreme weather events. (Evaluating)

CLO5: Assess the role of climate change in altering weather patterns and atmospheric processes. (Evaluating)

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	-	2	-
CLO2	3	2	-	2	-
CLO3	3	2	-	3	2
CLO4	3	2	-	3	2
CLO5	2	2	-	3	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Unit 1: Introduction (15 hrs): Climatology and Its History. Atmospheric Composition and its Variation; Atmospheric Layers; Solar Radiation; Greenhouse Effect; Heat Budget; Horizontal Heat Transport.

Unit 2: Atmospheric Moisture Budget: (15 hrs): Hydrological Cycle; Humidity, Evaporation; Condensation; Precipitation Forms and Characteristics; Adiabatic Temperature Change; Air Stability and Instability; Cloud Formation; Formation of Precipitation; Types of Precipitation.

Unit 3: Atmospheric Motion: (15 hrs): Principles-Horizontal Motion, Divergent, Vertical Motion and Vorticity; Local Wind; Planetary Scale Motion-Variation of Pressure and Wind with Height; The Global Wind Belts; The General Circulation (Hadley, Walker).

Unit 4: Atmospheric Disturbances and Climate Dynamics: (15 hrs) Cyclones: tropical and temperate; Anti-cyclones; tornados; Indian monsoon; Southern Oscillation Events. Weather Patterns and Extreme Events. Impacts of Climate Change.

Essential Reading

- Barry, R. G., & Chorley, R. J. (2018). *Atmosphere, weather and climate* (9th ed.). Routledge.
- Marshall, J., & Plumb, R. A. (2008). *Atmosphere, ocean, and climate dynamics: An introductory text*. Elsevier.
- Lal, D. S. (2022). *Climatology*. Pravalika Publication.
- Hartmann, D. L. (2016). *Global physical climatology* (2nd ed.). Academic Press.
- Ruddiman, W. F. (2018). *Earth's climate: Past and future* (4th ed.). W. H. Freeman and Company.
- Singh, S. (2020). *Climatology*. Sharda Pustak Bhawan.
- Barry, R. G., & Hall-McKim, E. A. (2014). *Essentials of the Earth's climate system*. Cambridge University Press.

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Title of the Course : **Oceanography and Hydrology**
Course Code : PAGTC12003
Credits : 04
L – T – P : 3 - 1 - 0

Prerequisite Course / Knowledge (If any): Basic knowledge of physical geography

Course Learning Outcomes (CLOs)

By the end of this course, students will be able to:

CLO1: Understand the Fundamentals of Hydrology.

CLO2: Examine Oceanographic Principles

CLO3: Analyze Oceanic and Atmospheric Circulation

CLO4: Understand Ocean Dynamics and Coastal Processes.

CLO5: Assess Human Interaction with Ocean and Water Resources

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	2	2	2
CLO2	3	3	1	2	2
CLO3	3	3	2	3	3
CLO4	3	3	2	3	2
CLO5	2	3	1	2	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Unit I: Oceanography: Origin of Ocean, History of Marine Science. Earths Structure and Plate Tectonics. Ocean Basin-Mapping, Ocean Morphology-Continental Margins and Topography of Deep Ocean. Ocean Sediments. Properties of Oceanic Water-Moderating Effect of Ocean Water, Solvent, Salinity and Temperature.

Unit II: Circulation-Atmospheric: Oceanic Circulation. Surface Circulation-Effect of Wind, Six Great Surface Circuits, Effect on Weather and Climate. Vertical Movement of Ocean Water. El Nina and La Nina. Thermohaline Circulation-Global Heat Connection and Deep-Water Formation.

Unit III: Waves, tides and Reefs: waves- Formation, Types of Waves, Wind Wave-Factors Influencing Wind Wave, Seiche Waves and Seismic Waves. Tides-Formation and Dynamic Theory of Tides. Coral Reefs and Theories of Formation of Coral Reef. Oceanic Community-Pelagic and Benthic. Use and Abuse of Ocean and Its Resources.

Unit IV: Hydrology-Introduction Importance of Water. Hydrological Cycle. Precipitation Process and Distribution, Measurement. Evaporation Process and Measurement. Storage. Runoff-Channel Flow, Measuring Stream Flow and Runoff, Estimating Stream Flow. Water Quality Measurement. Water Resource Management.

Essential Reading

- Garrison T. (2012) Essentials of Oceanography 6th Edition. Published by Brooks/Cole, Cengage Learning, Canada.
- Lal D. S. (2023) Oceanography. Publisher Sharda Pustak Bhawan.
- Davie T. (2008) Fundamentals of Hydrology 2nd Edition. Routledge fundamentals of Physical Geography series. Publisher Routledge.
- Reddy P J R. (2016) A Textbook of Hydrology. Published by Laxmi Publications (p) Ltd.


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Title of the Course : **Geographical Information System**
Course Code : PAGTS1200
Credits : 03
L – T - P : 2 - 1 - 0

Prerequisite Course / Knowledge (If any): Basic concepts of computer, geography, cartography, and fundamentals of map-making. Basic knowledge of data handling and structures

Course Learning Outcomes (CLOs)

By the end of this course, students will be able to:

- CLO1.** Understand the Basics of Computer and GIS
- CLO2.** Analyze Data in GIS and Address Errors
- CLO3.** Apply GIS Project Design Methods
- CLO4.** Understand Data Storage Techniques and GNSS Components

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	2		2
CLO2	2	3	3	2	2
CLO3		2	3	3	2
CLO4			3	3	2

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.

Examination Scheme: Internal-30 End Semester Examination-45


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Course Content

Unit-I: Basics of Computer: Hardware, Software, Input Device, Output Device, Computer Language. Introduction to GIS: Definitions of GIS, Components of GIS. Overview of GIS Software. Spatial Data Models - Raster and Vector, Data Structure.

Unit-II: Data in GIS: Sources of Data, Data Accuracy, Precision, Error and Uncertainty, Sources of Errors, Types of Error. Topology Building - Edit and Correction of Errors. Coordinate Systems – Geographic and projection. GIS Project Design: Frame The Question, Explore and Prepare Data, Choose Analysis Methods and Tools, Perform the Analysis, and Examine and Refine Results.

Unit-III: Methods of Storing Vector and Raster Data: Block Code, Run-Length Encoding, Chain Coding, Quadtree. Global Navigation Satellite System: GNSS Components, Satellite Orbit, Satellite Position on Orbital Plane, Signals, Reference System and Observation Techniques.

Essential Reading:

- Peter A. Burrough and Rachael A. McDonnell, 2011, Principles of Geographic Information Systems, Oxford University Press.
- Ian Heywood, Sarah Cornelius and Steve Carver, An Introduction to Geographic Information System, 2010, third edition, Pearson Education Ltd.
- David O'Sullivan and David J. Unwin, 2010, Geographic Information analysis, second edition, John Wiley & Sons.
- Paul A. Longley, Michael F. Goodchild, David J. Maguire, David W. Rhind, 2011, Geographic Information Systems and Science, third edition, John Wiley & Sons.
- John R. Jenson and Ryan R. Jensen, 2013, Introductory Geographic Information system, Pearson Education.
- C.P Lo and Albert K.W. Yeung, 2006, Concepts and Techniques of Geographic Information System, Prentice Hall India.
- <https://www.princeton.edu/~alaink/Orf467F07/GNSS.pdf>
- N.K. Agarwal, Essentials of GPS.


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Title of the Course : **Surveying and GNSS (Practical)**
Course Code : PAGPA12101
L-T-P : 0 -0 -2
Credits : 2
Prerequisite Course / Knowledge (If any): Basic Knowledge on Surveying

Course Learning Outcomes

After completion of this course, the students will be able to

CLO1: Recall the fundamental concepts and historical development of modern surveying techniques, including prismatic compass surveys, leveling methods, and GNSS systems.

CLO2: Explain the working principles and functions of modern surveying instruments such as Auto Level, Theodolite, Total Station, and the components of GNSS, including Space, Ground, and Control segments.

CLO3: Apply various surveying techniques, such as prismatic compass surveys, Auto Level, Theodolite, Total Station, and GNSS equipment, to collect accurate data in field surveying tasks.

CLO4: Analyze the errors and accuracy of different GNSS and traditional surveying techniques, such as DGPS, prismatic compass surveys, and leveling methods, and evaluate their impact on data precision.

CLO5: Generate and interpret maps using GPS and GNSS data collection, applying survey techniques to produce actionable insights from the data.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	2	1	1	1
CLO2	2	2	2	1	1
CLO3	3	3	3	2	1
CLO4	3	3	2	2	2
CLO5	2	3	3	2	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Unit-I: Survey

History of Modern Surveying - Modern Survey Techniques - Prismatic Compass Survey (Radiation-Intersection-Open Traverse -Closed Traverse) - Auto Level- Height of Collimation Method and Rise and Fall Method (Simple Levelling-Differential Levelling) – Theodolite and Total Station and their uses.

Unit-II: GNSS

Definition and History - Functions and Working Principles - Segments of GNSS: Space, Ground, and Control segment - Types of GNSS receivers and Antennas, Receiver pre-amplifier - DGPS concept, Various DGPS survey techniques - GPS equipment - GNSS errors and accuracy - GNSS applications - Fundamentals of Mobile Mapping, Mobile Mapping Application - GPS data collection (Point, Line, and Polygon) and plotting, generate maps and interpret it.

Essential/Required Readings

- Chandra, A. (2010). *Introduction to Geoinformatics*. Tata McGraw-Hill Education.
- Chandra, P. (2014). *Surveying: Vol. 1 & Vol. 2*. New Age International. (Indian author)
- Deshpande, G.B. (1991). *Surveying*. Everest Publishing House, Pune, India.
- Husain, I. (2008). *Advanced Surveying: Total Station, GIS, and Remote Sensing*. CBS Publishers.
- Kaplan, E. D., & Hegarty, C. (2006). *Understanding GPS: Principles and Applications*. Artech House.
- Misra, P., & Enge, P. (2011). *Global Positioning System: Signals, Measurements, and Performance*. Ganga-Jamuna Press.
- Misra, R.P. and Ramesh, A. (1989). *Fundamentals of Cartography*. Concept Publishing Company, New Delhi.
- Parkinson, B. W., Spilker, J. J., Jr., & Axelrad, P. (1996). *Global Positioning System: Theory and Applications, Volume 1 & 2*. AIAA.
- Pundit, V. S. (2011). *Modern Surveying: Instrumentation and Techniques*. PHI Learning.
- Rao, B. K., & Sharma, P. (2010). *Surveying and Leveling with GPS Systems*. Wiley India.
- R.L. Singh (1998). *Elements of Practical Geography*. Kalyani Publ. Delhi.
- Saha, P. and Basu, P. (2013). *Advanced Practical Geography*. Kolkata Books and Allied Publisher, Kolkata.
- Sarkar, A. (2015). *Practical Geography: A Systematic Approach*. Orient Black Swan Private Ltd., New Delhi.
- Sideris, M. G. (2000). *Global Navigation Satellite Systems: Applications to Geodesy and Surveying*. Springer.


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Paper Title : **Migration Studies (Generic Elective)**
Course Code : PAGTG12301
L-T-P : 3-1-0
Credits : 04
Prerequisite Course / Knowledge (If any): Basic Geography

Course Learning Outcomes (CLOs)

After completion of this course, the students will be able to:

CLO1: Describe in detail the main trends of human mobility, migration policies and their social repercussions and theoretical foundations

CLO2: Assess in historical and differentiated experiences in migration and development, emerging migration issues, contemporary policy suggestion for migration

CLO3: Prepare them to face the complex global, regional, and local challenges in migration and development.

CLO4: Revise the theories of migration and development and to evaluate and interpret the main theoretical and empirical scholarly and scientific debates that exist in India on migratory studies.

Mapping of Courses Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1		2	
CLO2			1	2	3
CLO3	1		3	2	
CLO4	2	3		1	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Unit I: Introduction, Anthropology and Economy to Migration (15 hrs.)

An introduction to migration, histories and theories of migration, The Migration – development” nexus. (Inter-linkages and ambiguities), Root-causes of migration, Comparative research on migrations, Statistics techniques in migratory studies, remittances, co-development, “brain drain”, “brain gain”, circular migration, Migrants as an emerging transnational actor: autonomy, voice and loyalty.

Unit II: Geopolitics of Migration and Human Mobility (15 hrs.)

Human mobility, the State and liberal democracy: concepts, approaches and debates, The Border as a political category in migration studies, Current international migrations: emigration/voluntary immigration; forced migrations; internally displaced persons; Refuge/asylum. Evolution and reality of population movements: forced migrations. History and evolution of the international protection of refugees. The universal standard of protection: the Geneva Convention, the UNHCR. Regional Protection of Refugees: America; Africa; Asia,

Unit III: Migration: Freedom of Movement, Security and Justice (15 hrs.)

Migration and the Question of Citizenship, Freedom, Security and Justice: Framework of the European Policies on Migration and Asylum, Public and private institutions and policies that influence migration and development in sending and receiving countries; Migration Policies and Laws, The situation of immigrants in Indian and European societies: education, housing and the labor market. Contemporary challenges concerning migrants and the laws of employment and documentations.

Essential Readings:

- Castles, S. (2010), Understanding Global Migration: A Social Transformation Perspective. *Journal of Ethnicity and Migration Studies* 36, pp. 1565–1586.
- De Haas, H. (2010), “Migration and development: A Theoretical Perspective”, *International Migration Review* 44 (1), pp. 227-264.
- ILO (2010), *International Labour Migration, A Rights-based approach*, Geneva, pp 13-37.
- Davis, K. (1951). *The population of India and Pakistan*. Princeton: Princeton University Press.
- Deshingkar, P., & Akter, S. (2009). *Migration and human development in India*. Human development research papers- 2009-13. Human Development Report Office (HDRO), United Nations Development Programme (UNDP).

Additional Readings:

- Martiniello, M. (2013), “Comparisons in Migration Studies”, *Comparative Migration Studies* 1 (1): 7-22. <https://link.springer.com/content/pdf/10.5117%2FCMS2013.1.MART.pdf>
- Portes, Alejandro (2009), “Migration and development: reconciling opposite views”, *Ethnic and Racial Studies*, 32 (1), pp 5-22.

- Bhagat, R. B. (2010). Internal migration in India: are the underprivileged migrating more. *Asia-Pacific Population Journal*, 25(1), 27-45.
- Deshingkar, P., & Grimm, S. (2005). Internal migration and development: A global perspective (No. 19). Geneva: International Organization for Migration.
- Kundu, A., & Sarangi, N. (2007). Migration, employment status and poverty: An analysis across urban centres. *Economic and Political Weekly*, 42(4), 299-306.
- Martin Ruhs (2013), *The Price of Rights. Regulating International Labour Migration*, Princeton University Press pp. 26-39.

Supplementary Readings:

- De Haas, H. and Vezzoli, s. (2010), "Migration and development. Lessons from the Mexico-US and Morocco-EU experiences", University of Oxford: International Migration Institute, Working paper N° 22.
- De Haas, H. and Czaika, M. (2013), "Measuring Migration Policies: Some Conceptual and Methodological Reflections", *Migration and Citizenship*, Summer 2013.
https://heindehaas.files.wordpress.com/2015/05/2013_measuring_migration_policies.pdf
- Castles, S. & Miller, M. J. (2009), "The age of migration: International population movements in the modern world", Palgrave Macmillan.
- International Organization for Migration. (2015). *World migration report 2015: Migrants and cities new partnerships to manage mobility*. International Organization for Migration.
- United Nations, Department of Economic and Social Affairs, Population Division (2017). *Trends in International Migrant Stock: The 2017 revision* (United Nations database, POP/DB/MIG/Stock/Rev.2017). UNFPA (United Nations Population Fund) (2016). *Migration*. Retrieved from <http://www.unfpa.org/migration>. Weiner, M. (1978). *Sons of the soil: Migration and ethnic conflict in India*. New Jersey: Princeton University Press


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Title of the Course : **Sustainable Development (Generic Elective)**
Course Code : **PAGTG12302**
L-T-P : **3 -1 -0**
Credits : **4**
Prerequisite Course / Knowledge (If any): **Basic knowledge of physics and natural sciences.**

Course Learning Outcomes

After completion of this course, the students will be able to

- CLO1:** Define and describe concept of Sustainable Development (SD)
CLO2: Classify Sustainable Development (SD) based on environmental, social and economic dimensions
CLO3: Discover the challenges for the Sustainable Development of the community.
CLO4: Calculate metrics to evaluate the position of the community from sustainable development perspectives
CLO5: Evaluate natural resources and their importance with respect to sustainable development
CLO6: Summarize the impact of sustainable development measures and community resilience practices.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2			
CLO2	3	2		1	
CLO3	3			1	1
CLO4	2	3		3	
CLO5		2		3	3
CLO6		2		3	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Unit-I: Introduction to Sustainable Development: Definition, History, Features and Principles of Sustainable Development; Sustainable Development Goals (SDGs).

Unit-II: Economic Sustainability: Economic theories related to sustainability, Sustainable business practices. Social Sustainability: Gender equality, Community engagement and participatory approaches. Environmental Sustainability: Fundamentals of ecology, factors influencing sustainability of ecosystems, Climate change, Natural resource management.

Unit-III: Measurement and Indicators of Sustainable Development Measurement Tool for Sustainable Development: Gross National Happiness (GNH) – Human Development Index (HDI) – Ecological Footprint (EF) ; Indicators of Sustainable Development: Indicators for Education – Indicators for Health – Indicators for Economy – Indicators for Gender Equality.

Unit-IV: Sustainability and Roles, Strategies of Business: Need to adopt sustainable strategy, Triple-bottom line Approach – People, Planet & Profit (3 BL Approach), Various Strategies for Sustainable Development:-Community Knowledge, Harness Technology, Green Organizations.

Reading list

- Agrawal, A N (1995). Indian Economy: Problems of development and planning. pune: Vishwa Prakashan.
- Baldev Raj Nayar, Globalization and Nationalism: The Changing Balance of India's Economic Policy, 1950–2000 (New Delhi: Sage, 2001)
- Saito, Osamu. Sharing Ecosystem Services. Springer Singapore, 2020.
- Nhamo, Godwell, and Vuyo Mjimba. Sustainable Development Goals and institutions of higher education. Springer, 2020.
- Brahmananda, P.R. and V.R. Panchmukhi (Eds.) (2001), Development Experience in the Indian Economy: Inter-State Perspectives, Bookwell, Delhi.
- Dholakia, R.H. (1985), Regional Disparity in Economic Growth in India, Himalaya Publishing House, Bombay.
- Friedman, J. and W. Alonso (Eds.) (1975), Regional Policy, Readings in Theory and Application, MIT Press, Cambridge, Mass.
- Glasson, J. (1975), An Introduction to Regional Planning: Concepts, Theory and Practice, Hutchison, London.
- Hoover, E.M. (1974), An Introduction to Regional Economics, Alfred A. Knopf, New York


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Title of the Course : **Basics of Geoinformatics (Generic Elective)**
Course Code : PAGTG12303
L – T – P : 2 - 1 - 0
Credits : 03

Prerequisite Course / Knowledge (If any): Basic concepts of geography, cartography, and spatial data, along with fundamental knowledge of physics, particularly electromagnetic radiation and coordinate systems.

Course Learning Outcomes (CLOs)

By the end of the course, students will be able to:

- CLO1.** Understand the fundamentals of remote sensing, including EMR characteristics and atmospheric interactions.
- CLO2.** Learn about satellite sensor systems and their role in remote sensing.
- CLO3.** Gain knowledge of GIS concepts, data models, and spatial data handling techniques.
- CLO4.** Develop skills in map visualization, including projections, symbology, and layout design.
- CLO5.** Understand GNSS principles, satellite positioning, and observation techniques.
- CLO6.** Explore applications of GNSS in geospatial analysis and mapping.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	2		2
CLO2	2	3	3	2	2
CLO3		2	3	3	2
CLO4			3	3	2
CLO5	2		3	2	2
CLO6		2	3	3	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level'

mapping, 1 for 'Low-level' mapping.

Course Content

Unit-I: Introduction to Remote Sensing: Characteristics of electromagnetic radiation (EMR), EMR spectrum, blackbody, radiation laws, the interaction of EMR with atmosphere and Earth's surface, reflection, absorption, transmission, scattering and refraction, atmospheric windows. Basics of satellite remote sensing: definition, principle, stages and types, platforms and orbits, sensors and scanning systems.

Unit-II: Introduction to GIS: Definition, development, components, objectives, hardware and software. The basis of GIS mapping: map projections, datum, and coordinate systems. Data types and inputs: spatial data and attributes, data input, scanning, digitization, error corrections, and topology. Data models: vector and raster, spatial and non-spatial data models. Data visualization: Types of visualization, map layout design, and symbology.

Unit-III: GNSS: Basics of GNSS: Introduction to Global Navigation Satellite System: Satellite orbit, satellite position on the orbital plane, GNSS components, signals, reference system and observation techniques, types of GNSS.

Essential Reading:

- Nejel Veziroglu – Remote Sensing: Energy, Related Studies – Hemisphere Publishing Corporation, Washington, 1975.
- Paul Curran – Principles of Remote Sensing, English Language Book Society, London, 1988.
- Robert, G.R. (Ed), Manual of Remote Sensing vol.I & II, American Society of Photogrammetry, New York, 1978.
- Swain & Davis, Remote Sensing: The Quantitative approach, Mc Graw Hill, 1978.
- Thomas M.Lillesand & Ralph W. Kiefer, Remote Sensing & Image Interpretation, John Wiley & Sons, New York 1987.


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SEMESTER II


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Title of the Course : **Environmental Geography and Biogeography**
Course Code: :PAGTA12101
L-T-P :3-1-0
Credits : 04

Prerequisite Course / Knowledge (If any): Basic knowledge of physics and natural sciences.

Course Learning Outcomes (CLOs)

After completion of this course, the students will be able to:

- CLO1.** Relate and recall the students to the relation between ecology and environment and also to the concept of environmental geography, environment and biogeography.
- CLO2.** Examine the consequences of environmental hazards, ecological adjustment and human perception on bio-diversities.
- CLO3.** Summarize and evaluate the students with environmental problems, programmes and policies in India.

Mapping of Courses Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1		2	
CLO2	2		1	2	3
CLO3	1		3	2	

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Unit II: Introduction to Environmental Geography, Bio-geography and Society (15 hrs.)

Definition, Nature and Scope of Environmental and Bio-Geography, Environment and Ecology: Scope, Role and Evolution, Importance of Environmental planning, protection and adaption, Environmental, Societal and Structural significance of the subject, Classical and Neo-classical approaches to industrialisation, urbanisation and growth, Environmental Education and Awareness.

Unit II: Human and Environmental Relationships (15 hrs.)

Characteristics and Interrelations, Human impact on Natural Environment: Pollution, Climate, Agriculture and Biodiversity, Locational Impact: Displacement and Deprivation, Impact of urban and industrial growth: Land surface temperature with Remote Sensing Technology, Changing perceptions- socio-spatial and political ecology. Environmental Impact Assessment: Aims and objectives, Framework and Methods of EIA, Merits and demerits.

Unit III: Ecosystem, Structural Organisation and the Environmental Issues (15 hrs.)

Concept and Importance of Ecosystem: Structure, Functions, Types of Ecosystems, The Gap and imbalances in the Ecosystems, Implications on human and ecology, Questions of ownership, accessibility and distribution, structure and organizational related dynamics: Uneven Development at the Core and Periphery.

Unit IV: Environmental Challenges, Choices and Development (15 hrs.)

Resources depletion, degradation and emerging crisis: Desertification, deforestation and losses in bio-diversity, Global warming: Resources, their exploitation-extraction and the scarcities, Examples from Indian states, Environmental and bio-diversity conservation and creation, challenges for the Global North and Global South, Sustainable development and conservation: Critical Perspective: Critical issues of Governance, Emergence of Global Environmentalism, Policies of Conservation and sustainability.

Essential Readings:

- Chandna R. C., 2002: Environmental Geography, Kalyani, Ludhiana.
- Goudie A., 2001: The Nature of the Environment, Blackwell, Oxford Singh, R.B. (Eds.) (2009) Biogeography and Biodiversity. Rawat Publication, Jaipur
- Ministry of Environment and Forests, 2006: National Environmental Policy-2006, Ministry of Environment and Forests, Government of India.
- Singh S., 1997: Environmental Geography, Prayag Pustak Bhawan. Allahabad.
- Singh, R.B. (1998) Ecological Techniques and Approaches to Vulnerable Environment, New Delhi, Oxford & IBH Pub.

Additional Readings:

- Adams, W. M. (1990): Green Development, Environment and Sustainability in the Third World, Routledge, London.
- Cunningham W. P. and Cunningham M. A., (2004): Principles of Environmental Science: Inquiry and Applications, Tata Mc Graw Hill, New Delhi.

- Dreze, J. and Sen, A. (1990): The Political Economy of Hunger, Vol. 1, 2, 3, Clarendon Press, Oxford.
- Elliott, J.A. (1999): An Introduction to Sustainable Development, Routledge.
- Harper, C.L. (2001): Environment and Society, Human Perspectives on Environmental Issues, Prentice Hall, New Jersey.
- Sarre, P. and Blunder, J. (1995): An Overcrowded World Population, Resources and the Environment, the Open University, Oxford
- Singh, R.B. and Hietala, R. (Eds.) (2014) Livelihood security in Northwestern Himalaya: Case studies from changing socio-economic environments in Himachal Pradesh, India. Advances in Geographical and Environmental Studies, Springer

Supplementary Readings:

- Amita Baviskar (ed) (2007): Waterscapes: The Cultural Politics of a Natural Resource Permanent Black Himalaya, Uttaranchal.
- Chopra, K, Kadekodi, G.K. and Murty, M.N. (1989): Participatory Development: People and Common Property Resources.
- Hay, P. (2009): Companion to Environmental Thought, Rawat Publication, Delhi.
- Ministry of Environment and Forests, 2006: National Environmental Policy-2006, Ministry of Environment and Forests, Government of India.
- Peet, R. Watts, M. (eds.) (1996): Liberation Ecologies: Environment, Development, Social Movements, Routledge, London. 20.
- Roy, P. K (2001): Economic Geography, A Study of Resources, New Central Book Agency, Kolkata.
- Singh, R.B. and Hietala, R. (Eds.) (2014) Livelihood security in Northwestern Himalaya: Case studies from changing socio-economic environments in Himachal Pradesh, India. Advances in Geographical and Environmental Studies, Springer.
- Singh, M., Singh, R.B. and Hassan, M.I. (Eds.) (2014) Climate change and biodiversity: Proceedings of IGU Rohtak Conference, Volume 1. Advances in Geographical and Environmental Studies, Springer.
- Smita Kothari, et.al. (ed.) (2003): The Value of Nature-Ecological Politics in India, Rainbow Publishers, Noida, U. P., India.


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Title of the Course : **Contemporary Geographical Thoughts**
Course Code : PAGTC22005
L-T-P : 3-1-0
Credits : 04
Prerequisite Course / Knowledge (If any): Basic knowledge of Geographical Philosophy.

Course Learning Outcomes (CLOs)

After completion of this course, the students will be able to:

- CLO1.** Understand the historical evolution of geography as a discipline, including key traditions and philosophical perspectives. (Remembering)
- CLO2.** Explain the major paradigms and revolutions in geographical thought, including spatial science and its critiques. (Understanding)
- CLO3.** Analyze alternative approaches to spatial science, such as humanistic, behavioral, welfare, and Marxist geography. (Analyzing)
- CLO4.** Evaluate post-structuralist and postmodern perspectives, including gender and feminist geography. (Evaluating)
- CLO5.** Assess the role of geographical thought in addressing contemporary global challenges. (Evaluating)

Mapping of Courses Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	-	2	1
CLO2	3	2	-	2	1
CLO3	3	2	-	3	2
CLO4	3	2	-	3	2
CLO5	2	2	-	3	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Unit I: What is Geography; The roots of Geography; Development into a discipline; Darwinism; Environmental Determinism; The Regional Tradition-The French School, Regional Studies in Britain, Indian Contribution.

Unit II: The Growth of Spatial Science; Paradigms & Revolutions; Positivism- Development and its criticism; Alternative to spatial Science-Humanistic Approach, Behavioural and welfare Geography, Structuralism, Marxist Geography.

Unit III: Post-structuralism and Beyond- Post-structuralism, Postmodernism, Gender and Feminist Geography, Geography of sexuality, Geography of ethnicity and Racialisation.

Unit IV: Post-modernism, Critical Geopolitics, Post-colonial Geographies, Decolonization and Anticolonial.

Essential Reading List

- Cresswell, T. (2013). *Geographic thought: A critical introduction*. Wiley-Blackwell.
- Holt-Jensen, A. (2018). *Geography: History and concepts* (5th ed.). SAGE Publications.
- Nayak, A., & Jeffrey, A. (2013). *Geographical thought: An introduction to ideas in human geography*. Routledge.
- Peet, R. (1998). *Modern geographical thought*. Blackwell.

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Title of the Course : **Remote Sensing**
Course Code : **PAGTC22006**
L-T-P : **3 -1 -0**
Credits : **4**
Prerequisite Course / Knowledge (If any): **Basic knowledge of physics and natural sciences.**

Course Learning Outcomes

After completion of this course, the students will be able to

- CLO1:** Define and describe remote sensing concepts, theories, and processes.
CLO2: Identify the real word phenomena/ geographical problem which could be monitored through the remote sensing technology.
CLO3: Interpret the remote sensing data to describe real-world phenomena/ geographical problems.
CLO4: Calculate quantitative parameters describing the real-world phenomena/ geographical problem.
CLO5: Evaluate the findings and develop some mitigation measures to solve the issue
CLO6: Construct independent research as part of a multi-disciplinary research and development project.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1		2	3		
CLO2		2	3		
CLO3		3	2	1	
CLO4		3	3	2	1
CLO5		1	2	3	3
CLO6		1	2	3	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Unit-I: Introduction to Remote Sensing: Definition and Concept; Concept of EMR and EMS; Process of Remote Sensing; Remote Sensing & its Types; Interaction of EMR with Atmosphere and Earth Surface Features, Atmospheric Windows; Concept of Spectral Reflectance Curve.

Unit-II: Remote Sensing Platforms, Orbits and Sensors: types of platforms used for remote sensing, Types of Orbits, Types of Sensors. History and development of Satellite Series: IRS, Landsat, Sentinel, Spot, MODIS, IKONOS and Quick Bird. and their characteristics.

Unit-III: Concept of Sensor/Image Resolution – Spatial, Spectral, Temporal and Radiometric. Satellite image interpretations: Image display and colour composites, major steps of Image interpretations. Elements of Visual Image Interpretations.

Unit-IV: Remote Sensing data products and their formats, Difference between Remote Sensing and In-situ data. Remote sensing-based Case Studies.

Reading list

- Joseph, G. 2005: Fundamentals of Remote Sensing, United Press India.
- Jensen J. R., 2004: Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall.
- M. ANJI REDDY Remote Sensing and Geographical Information Systems
- Siddiqui (2011). Concepts And Techniques Of Geoinformatics
- Lillisand,T., Keifer, Ralph W., Chipman, J. 2011. Remote Sensing and Image Interpretation. John Wiley Pub., New York.
- Campbell, J.B. 1996(2nd edition). Introduction to Remote Sensing. Taylor and Francis, London.
- Curran, P. 1985. Principles of Remote Sensing. Longman, London.
- Sabins, J.F.F. 1997. Remote Sensing: Principles and Interpretation. W.H. Freeman & Co., New York.
- Jensen, J.R. 2013. Remote Sensing and Environment. Pearson India
- Kumar, S. 2005. Basics of Remote Sensing and GIS. Laxmi Pub.
- Basudeb Bhatta: Remote Sensing & GIS (2nd Edition)


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Title of the Course : **Cartography and Map Interpretation (Practical)**
Course Code : PAGPC12003
L – T – P : 0 – 0 – 3
Credits : 03

Prerequisite Course / Knowledge (If any): Basic concepts of geography, cartography, and spatial data, along with fundamental knowledge of physics, particularly electromagnetic radiation and coordinate systems.

Course Learning Outcomes (CLO):

By the end of this course, students will be able to:

- CLO 1:** Students will learn the coordinates systems of the earth and various map projection techniques for better representation of a three-dimensional globe or part of it on the two-dimensional plane.
- CLO 2:** Students will learn skills of map preparation and map design techniques for effective visualization and representation of the underlying geological structure of any given area.
- CLO 3:** Students will learn to read special maps such as a topographical map, and interpret the geographical and human-made features using appropriate morphometric and graphical analysis.

Mapping the matrix of Course Learning Outcomes (CLO) and Programme Learning Outcomes (PLO)

	PLO-1	PLO-2	PLO-3	PLO-4	PLO-5
CLO-1	3	2	3	2	1
CLO-2	3	2	3	2	3
CLO-3	3	2	3	3	2

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Unit-I: Map projections- basic terminologies, standard parallels, scale factors, classifications of map projections; Polar types- gnomonic projection, stereographic projection, orthographic projection, equal-area projection; Conical type- one standard parallel, two standard parallels; Cylindrical type- cylindrical equal area projection, Mercator's projection; Modified projections- Bonne's projection, Sinusoidal projection, Polyconic projection.

Unit-II: Geological map – rock, bed, bedding plane, conventional symbols for rocks; Identification of series and unconformity; Identification of horizontal, vertical, unclinal, folded, and faulted structures; Method of drawing strike lines and determination of dip; Rules of 'V's; Construction of geological sections; Calculation of bed thickness; Interpretation of geological map – topography, structure, succession, geological history, topography in relation to structure.

Unit-III: Topographical map - Topographical Map– identification of map scale, legends, symbols, and contours, ; History of the topographical map; Derivation of topo map number. Physical Features on the Topographical Map– contour line pattern and identification of landforms; Slopes; Faults; Cuesta and hogback; valley; Drainage pattern- dendritic, tillage, rectangle, radial, centripetal, etc.; Meandering; Vegetation and forests. Physiographic divisions; Slope Analysis – Wentworth's method. Cultural Features on the Topographical Map – Settlement types and pattern; Transport network; Other man-made features; Cross and Longitudinal Profiles.

Essential Reading

- Ashis Sarkar. Practical Geography: A Systematic Approach. Orient Longman
- R N Mishra & P K Sharma. Practical Geography: Methods and Techniques. Pareek Publications, Jaipur
- Frederick Pearson. Map Projections: Theories and Applications. CRC Press, Inc. Florida
- S M Mathur. Guide to Field Geology. PHI Learning Private Ltd, New Delhi
- N W Gokhale. A Manual of Problems in Structural Geology. CBS Publishers and Distributors Pvt Ltd


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Title of the Course : GIS (Practical)
Course Code : PAGPA22102
L – T – P : 0 – 0 – 2
Credits : 02

Prerequisite Course / Knowledge (If any): Basic understanding of GIS concepts, coordinate systems, spatial data types, and fundamental cartographic principles.

Course Learning Outcomes (CLOs)

After completion of this course, the students will be able to

- CLO1. Learn to collect, manage, and transform spatial and non-spatial data.
- CLO2. Gain proficiency in geo-referencing, topology correction, and data conversion.
- CLO3. Develop skills in spatial queries and thematic mapping.
- CLO4. Perform proximity analysis and 3D analysis using GIS techniques.
- CLO5. Apply GIS methods for effective spatial data analysis and visualization.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2		3	2	2
CLO2	1		3	3	2
CLO3		2	3	3	2
CLO4		3	3	3	3
CLO5	1	2	3	3	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Unit-I: Collection of Spatial and Non-Spatial Data for GIS Exercise; Georeferencing (using GCP, Image to Image), Coordinate Systems and Transformation; Creation of Shapefile, Creation of Geodatabase, Point, Line, and Polygon; Correction of Topology, Error Identification and Correction; Data Conversion: Raster to Vector, Vector to Raster, Line to Polygon, Polygon to Line and Polygon to Point; Creation of Attribute Data: Manual Entering, Join and Relate Table, Preparation of Charts Using Attribute Table.

Unit-II: Vector Based Queries: Spatial and Attribute; Preparation of Thematic Map: Dot Density Map, Choropleth Map, Location Chart Map, Proportional Symbol Map; Proximity Analysis: Buffer (Single Ring, Multiple Ring, Variable Buffer) and Thiessen Polygon; Preparation of Final Layout and Export. 3D Analysis: TIN, DEM, Slope, Aspect, Hillshade, and Viewshed; Interpolation - IDW, Kriging, Spline, Trend, and Natural Neighbour.

Essential Reading:

- Kang – Tsung Chang, 2018, Introduction to Geographical Information System, New York: McGraw-Hill Education, ISBN 9781259929649.
- Stephen R. Galati, 2006, Geographic Information Systems Demystified, ARTECH HOUSE, INC., ISBN-13: 978-1-58053-533-5.
- Michael N. DeMers, 2009, GIS For Dummies, Wiley Publishing, Inc., ISBN: 978-0-470-23682-6.



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Title of the Course : **Applications of Geoinformatics (Generic Elective)**
Course Code : **PAGTG22304**
Credits : **03**
L – T – P : **2 - 1 - 0**

Prerequisite Course / Knowledge (If any): Basic knowledge of geomorphology, hydrology, remote sensing, and GIS concepts.

Course Learning Outcomes (CLOs)

- CLO1.** Analyze landforms, drainage basin morphometry, and landslide hazard mapping using aerial and satellite data.
- CLO2.** Develop skills in interpreting aerial photographs and satellite imagery for geospatial analysis.
- CLO3.** Understand watershed hydrology and its physical processes.
- CLO4.** Apply remote sensing techniques for water resource assessment and hydrological modeling.
- CLO5.** Gain expertise in vegetation classification, forest inventory, and biomass estimation.
- CLO6.** Learn fire risk zonation, land evaluation for forestry, and forest ecosystem analysis.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	3	3	2	3
CLO2	2	2	3	3	2
CLO3	3	3	2	2	2
CLO4	2	3	3	3	3
CLO5	2	3	3	2	3
CLO6	2	3	2	3	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.

Course Content

Unit-I: Analysis of landforms, drainage basin morphometry, and slope mapping for geological studies. Application of integrated models for landslide hazard zonation and mapping. Interpretation of aerial photographs and satellite imagery for geospatial analysis.

Unit-II: Fundamentals of watershed hydrology and physical processes within a watershed. Application of remote sensing in water resource assessment and river valley projects. Spatial and non-spatial data organization for water resource engineering and hydrological modeling.

Unit-III: Remote sensing techniques for vegetation classification, forest inventory, and biomass estimation. Sampling methods for growing stock assessment and forest management strategies. Fire risk zonation, land evaluation for forestry, and forest ecosystem analysis.

Essential Reading

- SPRS Technical Commission VII (2002): Symposium on Resource Environmental Monitoring, ISRS Annual Convention, IIRS, Dehradun
- Deekshatulu, B. L. (1990): Description and use of Land use/Landcover, NRSA, Hyderabad
- Harris, J. E. (1990): Earthwatch – The Climate from space, Ellishorwood Ltd., Midsower Norton
- Lal, D. S. (1998): Climatology, Chaitanya Publishing House, Allahabad
- Escalante, R. B. (2012): Remote Sensing- Advances techniques and Platforms, Intech, Rijeka Croatia
- Escalante, R. B. (2012): Remote Sensing Application, Intech, Rijeka Croatia
- Roy, P.S., Dwivedi, R. S. (2010): Remote Sensing Application www.nrsc.gov.in/Learning-Center, E Book. html



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Title of the Course : **Gender and Space (Generic Elective)**
Course Code : PAGTG22305
Credits : 03
L – T – P : 2 - 1 - 0

Prerequisite Course / Knowledge (If any): Basic knowledge of geographical concepts.

Course Learning Outcomes (CLOs)

After completion of this course, the students will be able to

- CLO1.** Critically analyze the social construction of gender and its spatial manifestations, drawing on feminist and geographical theories. (*Analysis*)
- CLO2.** Apply intersectional perspectives to examine how gender interacts with other
- CLO3.** Identities in shaping spatial inequalities and power structures. (*Application*)
- CLO4.** Evaluate gendered labor, domestic spaces, and everyday geographies to understand the role of gender in economic, social, and political spaces. (*Evaluation*)
- CLO5.** Examine colonial, postcolonial, and geopolitical influences on gendered identities and spaces, with a focus on nationalism, international relations, and feminist geopolitics. (*Understanding & Analysis*)

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	0	3	2
CLO2	3	2	0	3	2
CLO3	3	3	0	3	3
CLO4	3	2	0	3	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.

Course Content

Unit I: Gender, Space, and Social Construction

Sex, Gender, and Social Construction – Understanding gender as a social and spatial construct; Gendered Spatial Imaginaries – Representation, discourse, and everyday practices of space. The Nature of Gender – Debates on biology, culture, and identity in geography. Thinking through Geographies – Feminist and queer geographies.

Unit II: Intersectional Geographies and Everyday Spaces

Intersectional Geographies – Race, class, caste, disability, and their spatial dimensions; Gendering Everyday Space – Public and private spaces, mobility, and urban geographies; Body Maps – The embodied experience of gender in different spatial contexts; Domestic Spaces & Domestic Labor – Feminized labor, care economies, and the home as a site of power.

Unit III: Gender, Power, and Global Structures

Gendering Work – Labor markets, informal economies, and gendered employment structures; Gender and Colonialism – Postcolonial feminist geographies and the legacy of colonial power; Gender, Nation, and International Relations – Feminist geopolitics, nationalism, and global governance; Future Directions in Gender Geography – Emerging debates and methodological innovations.

Essential Readings

- Butler, J. (1990). *Gender trouble: Feminism and the subversion of identity*. Routledge.
- Massey, D. (1994). *Space, place, and gender*. Polity Press.
- McDowell, L. (1999). *Gender, identity and place: Understanding feminist geographies*. Polity Press.
- Valentine, G. (1993). *(Hetero)sexing space: Lesbian perceptions and experiences of everyday spaces*. *Environment and Planning D: Society and Space*, 11(4), 395-413.

Suggested Readings (Additional Critical Perspectives)

- Domosh, M., & Seager, J. (2023). *Gender and Geography: A Critical Introduction*. Wiley.
- Mollett, S., & Faria, C. (2018). "The spatialities of intersectional thinking: Fashioning feminist geographic futures." *Gender, Place & Culture*, 25(4), 565-577.
- Oswin, N. (2019). "An other geography." *Dialogues in Human Geography*, 9(1), 59-61.
- Radcliffe, S. A. (2017). "Género y Buen Vivir: Reimagining indigenous development in plurinational Bolivia." *Progress in Human Geography*, 30(4), 524-532.
- Williams, J. (2016). "Radical Inclusion: Recounting the Transgressive Body in Geographical Research." *Gender, Place & Culture*, 23(7), 1038-1046.

Title of the Course : **Political Geography** (Generic Elective)
Course Code : PAGTG22306
L-T-P : 2-1-0
Credits : 03
Prerequisite Course / Knowledge (If any): Basic knowledge of geographical concepts.

Course Learning Outcomes (CLOs)

After completion of this course, the students will be able to:

CLO1: Learn the concept of nation, state, nation-state relations and geopolitical theories.

CLO2: Understand the different dimensions of electoral geography and resource conflicts.

CLO3: Evaluate the geopolitics of and migration at world level.

Mapping of Courses Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	1	2		3	
CLO2	2		1	2	3
CLO3	2		1	2	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Unit I: Nation-State, Geopolitical Theories (15 hrs.)

Approach and Unified Field Theory of Political Geography, Relevance of Political Geography in International Relations, State, Nation and Nation State – Concept of Nation and State, Attributes of State – Frontiers and Boundaries (Concepts and Classifications, Continental and Maritime Boundaries), Shape, Size, Territory and Sovereignty (Laws of Spatial Growth of State), Concept of Nation State; Geopolitics; Theories (Heartland and Rimland).

Unit II: Geo-economics, Geopolitics and International Relations (15 hrs.)

Geopolitics and International Relations, Core Theories and Debates, War and Peace in Geopolitics, Comparative Politics and Governance with Special Reference to UK, USA, Russia and China, Globalization, Geo-economics and World Order, Regionalism and Multilateralism in the International System, Science, Technology and Geopolitics, Arms Control, Nuclear Disarmament and Nuclear Futures, Strategies and Negotiations in International Treaties.

Unit III: Electoral Geography, Geopolitics of National-International Aids (15 hrs.)

Electoral Geography –Geopolitics, Security and Environmental Change, Geography of Voting, Geographic Influences on Voting pattern, Geography of Representation, Gerrymandering, Political Geography of Resource Conflicts – Water Sharing Disputes, Disputes and Conflicts Related to Forest Rights and Minerals, Politics of Displacement: Geopolitics of Foreign Aid, Assistance and Development Cooperation, Issues of relief, compensation and rehabilitation in reference to dams and special economic zones.

Essential Readings

- Adhikari, S. (2013). Political Geography of India. Allahabad, India: Sharda Pustak Bhawan.
- Blacksell, Mark (2006), Political Geography, Routledge Contemporary Human Geography Series, Routledge, London.
- Cox, K. (2002). Political Geography: Territory, State and Society. USA: Wiley- Blackwell
- Jones, M. (2004). An Introduction to Political Geography: UK: Space, Place and Politics, Routledge.
- Verma, M. K. (2004). Development, Displacement and Resettlement. Delhi, India: Rawat Publications.

Additional Readings

- Agnew, J. (2002). Making Political Geography. London, UK: Arnold.
- Cox, K. R., Low M. and Robinson J. (2008). The Sage Handbook of Political Geography. USA: Sage Publications.
- Painter, J. and Jeffrey, A. (2009). Political Geography. USA: Sage Publications.
- Ryan D. Enos. (2017), The Space Between Us: Social Geography and Politics. Cambridge University Press, New York.
- Taylor, P. and Flint, C. (2000). Political Geography. UK: Pearson Education.
- Zarakol, Ayse. (2022). Before the West: The Rise and Fall of Eastern World Orders.

Supplementary Readings

- Gallaher, C., et al, (2009). Key Concepts in Political Geography. USA: Sage Publications.
- Glassner, M. (1993). Political Geography. USA: Wiley.

- Helen, V. Milner (1998). Interests, Institutions, and Information: Domestic Politics and International Relations.
- Jennifer Mitzen (2013). Power in Concert: The Nineteenth-Century Origins of Global Governance.
- Joshua Shiffrin (2018). Rising Titans, Falling Giants: How Great Powers Exploit Power Shifts.
- Jonathan A Rodden (2019). Why Cities Lose: The Deep Roots of the Urban-Rural Political Divide. Basic Books.



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SEMESTER – III

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Title of the Course : **Economic Geography**
Course Code : **PAGTC32007**
L-T-P : **3 -1 -0**
Credits : **4**
Prerequisite Course / Knowledge (If any): **Basic knowledge of Geography**

Course Learning Outcomes

After completion of this course, the students will be able to

CLO-1: Remember key concepts of spatial economics and understand how economic systems are connected to geographical factors.

CLO-2: Understand various development indicators and analyze their impact on global development issues.

CLO-3: Remember important economic growth theories and apply them to analyze real-world economic scenarios.

CLO-4: Analyze and evaluate economic geography theories to examine spatial patterns and economic relationships.

CLO-5: Evaluate different development approaches and create solutions to address economic inequalities and global challenges

CLO-6: Create innovative strategies for sustainable economic development that address both local and global challenges

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	1	2	2
CLO2	2	3	1	3	2
CLO3	3	2	1	2	
CLO4	3	2	2	3	2
CLO5	2	2		3	3
CLO6	2	2	1	3	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.

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Course Content

Unit I: Fundamentals (15 hrs)

Introduction to Spatial Economics, issues in spatial economic systems; economic-geographic links. Recent trends of economic geography, Stages of Growth; Evolution of Economic Systems and Sectors: stages of economic growth; evolution of economic systems; three-sector hypothesis and post-industrial society; informal economy and social accounting.

Unit II: Concept of Development (15 hrs)

Concept of Growth and Development, Measurements and Indicators of Development – Geographical, Economic, Social, Demographic Measures, Sustainable development and Human Development, Disparities in world economic development, Neoliberalism and grass root approach, Patterns of development- global spatial inequalities, Current development issues and challenges: trade, debt and aid

Unit III: Theoretical Perspectives in Economic Geography (15 hrs)

Weber's Least Cost Theory, Central Place Theory (Christaller), World-Systems Theory (Wallerstein), Rostow's Stages of Growth, the Core-Periphery model, New Economic Geography (Krugman), and Structuralism and Dependency Theory, Concept of Labour geography, Agricultural location theory (Von Thunen) and their applications.

Unit IV: Contemporary Developments in Economic geography and Space Economy of Rural and Urban Systems with special Reference to India. (15 hrs)

Information and Knowledge Economy, Consumption pattern and Financial Management, Climate Change and Economics of Carbon Trade. Rural Economic systems of India, Urban Economic Systems of India, Economic activities and its impacts on society, economic activities and its impact on Environment. Economic discrimination with special reference to India. India @ 2047 – A Developed Nation, Make in India-2014, Digital India-2016, Startup India-2016, Standup India 2016, Amrit Kaal, Atmanirbhar Bharat and Viksit Bharat 2047

Essential/Required Readings

- Ahmad, A. (2010). Economic Geography. New Delhi: Omega Publications.
- Dimou, M., & Schaffar, A. (2016). Economic Geography. New York: Magnum Publishing LLC.
- Becker, G. S. (1957). The economics of discrimination. University of Chicago Press.
- Hussain, M. (2014). Economic Geography. New Delhi: Anmol Publications.
- Hodder, B. W. (2008). Economic Geography. New Delhi: Rawat Publications.
- Malik, R. (2012). Economic Geography (1st ed.). New Delhi: Sonali Publications.
- Saxena, H. M. (2013). Economic geography. Rawat Publication. New Delhi.
- Singh K. & Siddiqui A. R. (2016). Economic Geography, Pravalika Publisher, Allahabad.
- Recommended Readings
- Hanink D. M. 1997. Principles and Applications of Economic Geography, John Wiley, New York
- Knox Paul, Agnew John, McCarthy Linda, 2008. The Geography of the World Economy, OUP, USA.
- MacKinnon D. and Cumbers A. 2007. An Introduction to Economic Geography: Globalization, Uneven Development and Place, Pearson/Prentice Hall, Harlow.

- Murray Warwick E. 2006. Geographies of Globalization. Routledge.
- Sheppard E. and Barnes T. J. 1984. The Capitalist Space Economy: Geographical Analysis after Ricardo Marx and Strafa, Unwin Hyman, London.

Paper Title : **Urban Geography**

Course Code : **PAGTC32008**

L-T-P : **3-1-0**

Credits : **04**

Prerequisite Course / Knowledge (If any): Basic knowledge of geographical concepts.

Course Learning Outcomes (CLOs):

CLO1: To understand the significance and recent trends in settlements geography

CLO2: To analyse the theories of urban evolution and growth, Hierarchy of urban settlements.

CLO3: To relate the various aspects with reference to the theories of urban place: location, site and situation;

CLO4: To illustrate the concept of urban hierarchies, the urban settlements and problems of urban planning in the Indian cities.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	2	1		3	
CLO2		2	1		3
CLO3	3	2		1	2
CLO4	3	1	2	2	

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.

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Course Content

Unit I: Introduction to Settlement and Urban Geography (15 hrs.)

Meaning, scope and significance of Settlement Geography, Historical background of classification of settlements, Approaches to the study of settlement geography, Approaches to the study of urban Geography, Geography and urbanism, Origin, evolution and growth of urban places, process of urbanization from ancient, medieval and modern period.

Unit-II: Classification of Settlements and Distributional Patterns (15 hrs.)

Definition and classification of settlement, Historical background of classification of settlements, Methods of classification of settlements (Types of Rural Settlements, Types of Urban Settlements), Morphological classification: Compact, Composite, Fragmented, Dispersed, Functional, Distributional pattern: Size, Density, Spacing, Dispersion.

Unit-III: Urban Functions, Hierarchies and Theories (15 hrs.)

Urban Functions and geographical situation, Theories of urban land use: Concentric Zone theory, Sector theory, Multiple Nuclei Theory, Concept and characteristics of C.B.D., Conurbation, Urban Agglomeration, Umland, Hinterland and Sphere of influence area, Methods of delimitation, Rural-urban fringe, Concept of Megalopolis and Metropolitan region, Rank size rule, central place theory of Christaller and Losch, Theory of Perroux and Boudeville.

Unit IV: Urbanisation: Planning and Problems (15 hrs.)

Growth of Urban Centres and role of urban centres in regional and national economy of India, Pre-colonial Economy and Society, Evolution of Mumbai, Kolkata, Chennai, Bengaluru, Delhi as an Industrial City, Urbanisation in India – Trends, Urban problems, Urban planning and policies in India: Principles of Urban Planning, Urban Layout Plan, Master Plan, National Urbanisation Policy, Planned Cities of India (Jamshedpur, Chandigarh, New Delhi, National Capital Region, Mumbai Metropolitan Region, Master Plan of Allahabad).

Essential Readings:

- Hussain, Majid. (2021) Human Geography, Rawat Publications, Jaipur, India.
- Kundu A. (1992): 'Urban Development and Urban Research in India,' Khanna Publication.
- Ramchandran, R. (1994): 'Urbanization and Urban Systems in India,' Oxford University Press, New Delhi.
- Siddhartha, K and Mukherjee, S. (2019): Cities Urbanisation and Urban Systems, Kitab Mahal, India.
- Tiwari, R.C. (2020), Settlement Geography: Rural and Urban Settlement, Pravalika Publications, Prayagraj, India.

Recommended Readings:

- Bose, A. (1980): 'India's Urbanization, Tata McGraw Hill, New Delhi.
- Carter H. (1979): 'The Study of Urban Geography, Arnold Heinemann, London.
- Hall, T. (2006): 'Urban Geography, Routledge, London.
- Mandal R.B. (2000): 'Urban Geography,' Concept Publishing Company, New Delhi.
- Ramchandran, R. (1994): 'Urbanization and Urban Systems in India,' Oxford University Press, New Delhi.

Additional Readings:

- Chorley R.J.O., (1966) Haggett P (ed): 'Models in Geography, Methuen, London.
- Dickinson, R.E. (1964): 'City and Region,' Routledge, London.
- King L.J., (1978) Golledge R.G.: 'Cities, Space and Behaviour,' Prentice Hall, Englewood Cliff, New Jersey.
- Mayer Harold M, (1967) & Kohn Clyde : 'Reading in Urban Geography,' Central Book Depot. Allahabad.
- Northam Ray M. (1975): 'Urban Geography John Killey and Sons, Inc, New York
- Prakasa Rao V.L.S., (1983): 'Urbanization in India – Spatial dimensions,' Concept Publishing Company, New Delhi.



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Title of the Course : **Population Geography**

Course Code : PAGTC32009

L-T-P :3 -1 -0

Credits :4

Prerequisite Course / Knowledge (If any): Basic knowledge of Population Geography

Course Learning Outcomes (CLOs)

By the end of the course, students will be able to:

- CLO1.** Explain key demographic concepts and measures related to population growth, distribution, and composition.
- CLO2.** Analyze fertility, mortality, and migration patterns and their impact on demographic change.
- CLO3.** change.
- CLO4.** Apply demographic theories and models to interpret population trends and transitions.
- CLO5.** Evaluate the relationship between population dynamics and socio-economic development.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2	-	2	1
CLO2	3	2	-	3	2
CLO3	3	2	-	3	1
CLO4	3	1	-	3	2

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Unit I: Demographic Foundations and Transition

Definition and scope of demography; measures of population distribution, growth, and age-sex composition; sources of demographic data – types, uses, and limitations; population and development linkage; Demographic Transition Model (DTM) and its implications for population change.

Unit II: Fertility Patterns and Change

Key concepts and terms in fertility studies; measures of fertility – crude birth rate, total fertility rate, age-specific fertility rate; determinants of fertility – social and proximate factors; theories of fertility change – demographic transition theory, wealth flow theory, diffusion innovation theory.

Unit III: Mortality Trends and Longevity

Definition and measures of mortality – crude death rate, age-specific mortality rate, standardized mortality ratio; infant and maternal mortality – causes and demographic impact; concept and application of life table in survival analysis and longevity studies.

Unit IV: Migration and Population Mobility

Basic concepts and definitions in migration studies; causes, types, and consequences of migration; theoretical frameworks – Ravenstein's Laws of Migration, Everett Lee's Push-Pull Theory, Mobility Field Theory, Lewis-Fei-Ranis Model of Development, Todaro's Model of Rural-Urban Migration; migration indices and estimation of lifetime and inter-censal migration rates using census data.

Essential Readings

- Bhende A Asha., Kanitkar Tara (1999). Principles of Population Studies. Himalaya Publishing House.
- Preston H Samuel., Heuveline Patrick., Guillot Michel (2001). Demography: Measuring and modelling population process. Blackwell publishers
- S.D Maurya. Population Geography (2000). Pravalika Publications.
- Shryock, S.H., Siegel S J., et al (1976). The Methods and Materials of Demography. Academic Press, INC.
- Moultrie, T., et al. Tools for Demographic Estimation (2013).
Access: <http://demographicestimation.iussp.org/content/get-pdf-book-website>
- Population Analysis for Policies and Programmes (2016). Access: <https://papp.iussp.org/#3>.

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Paper Title : **Research Methods and Ethics**
Course Code : PAGTC32010
L-T-P : 3-1-0
Credits : 04

Prior Knowledge: Basic Understanding of Research

Course Learning Outcomes (CLO):

After completion of the course the students will be able to

CLO 1: Students will learn to define a research problem and objectives, select appropriate research methods, and identify the research gap and processes.

CLO 2: Students will learn about sampling methods, research design, and tools of data collection for conducting scientific research.

CLO 3: Students will learn to define the hypothesis of research and also be able to test the hypothesis using appropriate statistical analysis and methods.

CLO 4: Students will develop skills in literature review, content analysis, and academic writing including data analysis and structured report writing.

Mapping the matrix of Course Learning Outcomes (CLO) and Programme Learning Outcomes (PLO)

PLO \ CLO	PLO-1	PLO-2	PLO-3	PLO-4	PLO-5
CLO-1	2	3	1	2	2
CLO-2	2	3	1	2	2
CLO-3	1	3	1	2	2
CLO-4	1	2	1	3	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Unit-I Concept of research- meaning, definition, and significance of research; Types of research – exploratory, descriptive, and explanatory research; fundamental research and action research; Research design- cross-sectional, longitudinal, experimental, quasi-experimental. Inductive vs Deductive methods.

Unit-II Sampling - meaning, purpose, and terminologies; Sampling Frame, Sampling types – random, stratified, clustered, multi-stage, multi-phase, and non-probability sampling; Sample size determination, Data collection methods- quantitative, qualitative, and mixed methods.

Unit -III Definition and terminologies of hypothesis – Degree of freedom, confidence interval, level of significance, p-value, Types and forms of hypothesis; Formation of hypothesis statement -alternative and null-hypothesis; Parametric tests – Z-test, T-test, ANOVA Test; Non-Parametric tests - Chi-square test, Median test, Wilcoxon's rank sum test, Freidman's two way ANOVA test

Unit- IV Literature review- literature search, content analysis; Data analysis and tabulation; Structured report writing and chapter organization; Use of SPSS/STATA; Submission of small project report based on secondary / field data

Essential Reading

- Singh, Yogesh Kumar (2006). Fundamental of Research Methodology and Statistics. New Age International Publisher.
- Kothari C R (2004). Research Methodology Methods and Techniques. New Age International Publisher.
- Ahuja Ram (2017). Research Methods. Rawat Publication
- Edwards Thomas (1985). Research Design and Statistics: A Bio-Behavioural Focus. TATA McGraw-hill Edition.
- Majhi R. Priti., Khatua K Prafull (2013). Research Methodology: Concepts, Methods, Techniques and SPSS (Text and Cases). Himalaya Publishing House. Lib ref- 41170 001.42. MAJ


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Title of the Course : **Remote Sensing (Practical)**
Course Code : **PAGPA32103**
L-T-P : **0 -0 -2**
Credits : **2**
Prerequisite Course / Knowledge (If any): Student should have basic familiarity with computer and accessories.

Course Learning Outcomes

After completion of this course, the students will be able to

- CLO1.** Outline and Recognize the required tools and menus of Software
- CLO2.** Apply the theoretical knowledge of remote sensing to identify correct satellite image to address a real word phenomena/ geographical problem.
- CLO3.** Interpret the remote sensing data with visual interpretation elements and Software skill to describe real word phenomena/ geographical problem.
- CLO4.** Compute quantitative parameters describing the real word phenomena/ geographical problem using the computational tool of the software.
- CLO5.** Analyze the quantitative and qualitative findings and display it in the form of map, tables and reports.
- CLO6.** Construct independent research as part of a multi-disciplinary research and development project with hands on experience in the software.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1		2	3		
CLO2		2	1	3	
CLO3		3	2	1	
CLO4		2	1	2	1
CLO5		2	1	3	3
CLO6		2	1	3	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Exercise 1: Introduction to the Image Processing Software

Exercise 2: Downloading of the freely-available satellite images and Topographic Images

Exercise 3: Georeferencing of Topographical Images

Exercise 4: Image Registration

Exercise 5: Creation of FCC and Visual Interpretation

Exercise 6: Enhancement of the satellite images

Exercise 7: Image Transformation of the satellite images

Exercise 8: Digital Classification of the satellite image

Reading list

- Joseph, G. 2005: Fundamentals of Remote Sensing, United Press India.
- Jensen J. R., 2004: Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall.
- M. ANJI REDDY Remote Sensing and Geographical Information Systems
- Siddiqui (2011). Concepts And Techniques Of Geoinformatics
- Lillisand,T., Keifer, Ralph W., Chipman, J. 2011. Remote Sensing and Image Interpretation. John Wiley Pub., New York.
- Campbell, J.B. 1996(2nd edition). Introduction to Remote Sensing. Taylor and Francis, London.
- Curran, P. 1985. Principles of Remote Sensing. Longman, London.
- Sabins, J.F.F. 1997. Remote Sensing: Principles and Interpretation. W.H. Freeman & Co., New York.
- Jensen, J.R. 2013. Remote Sensing and Environment. Pearson India
- Kumar, S. 2005. Basics of Remote Sensing and GIS. Laxmi Pub.
- Basudeb Bhatta: Remote Sensing & GIS (2nd Edition)


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Paper Title : **Quantitative Techniques (Practical)**
Paper Code : **PAGTD32201**
L-T-P : **0-0-2**
Credit : **2**

Prerequisite Course / Knowledge (If any): Student should have basic familiarity with statistics, computer and accessories.

Course Learning Outcomes (CLO):

CLO 1: Students will be familiar with the data characteristics, data analysis, and data visualization using statistical methods and techniques.

CLO 2: Students will learn the methods to quantify the relationships, and strength of associations between and among the variables.

Mapping the matrix of Course Learning Outcomes (CLO) and Programme Learning Outcomes (PLO)

PLO \ CLO	PLO-1	PLO-2	PLO-3	PLO-4	PLO-5
CLO-1	1	3	1	3	2
CLO-2	1	3	1	3	2

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

- Exercise 1.** Concept of data, scale of measurement, types of data distribution;
Exercise 2. Frequency distribution table; Cumulative frequency distribution,
Exercise 3. Graphical representation of frequency distribution- Histograms, frequency polygon, frequency curve, cumulative frequency polygon;
Exercise 4. Measures of central tendency- mean, median, mode;
Exercise 5. Measures of dispersions- absolute measures of dispersions, relative measures of dispersions; Measures of frequency curve- skewness, kurtosis
Exercise 6. Correlations- meaning, types, scatterplots, coefficient of correlation;
Exercise 7. Regression- Linear regression, multiple linear regression, binary logistic regression;
Exercise 8. Indexing methods- Z-score, Factor analysis; Principal component analysis.

Note: A record book to be submitted

Essential Readings:

- Sarkar, Ashis (2008). Quantitative Geography: Techniques and Presentations. Orient BlackSwan.
- Alvi Zamir (2001). Statistical Geography: Methods and Applications. Rawat Publications.
- Rogerson, Peter A (2001). Statistical Methods for Geography. SAGE.
- Spiegel and Stephens. Statistics (2008). Tata McGraw Hill Education Private Ltd.


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SEMESTER IV



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Title of the Course : **Geography of India**
Course Code : **PAGTC42011**
L – T – P : **3 - 1 - 0**
Credits : **04**

Prerequisite Course / Knowledge (If any): This syllabus provides a comprehensive understanding of India's physical, climatic, and ecological characteristics, its population dynamics, and economic resources.

Course Learning Outcomes (CLOs)

After completing this course, students will be able to:

- CLO1.** Understand India's Physical Geography.
- CLO2.** Analyze the Natural Resources and Environmental Conditions.
- CLO3.** Examine the Drainage System of India.
- CLO4.** Assess Population and Economic Aspects

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1			
CLO2		3		2	2
CLO3	3	2			
CLO4			2	3	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Unit 1: Location and Extent, Physiographic Divisions: Himalayas, Northern Plains, Peninsular Plateau, Coastal Region, Islands.

Unit 2: Soils: Types, characteristics, distribution. Vegetation: Types, characteristics, distribution. Climate: Seasons, characteristics. Drainage System of India: Difference between Himalayan River & Peninsular Rivers. Indus, Ganga, Brahmaputra, Narmada, Tapi, Mahanadi, Godavari, Krishna, Cauvery.

Unit 3: Agriculture: Agricultural Seasons in India, Characteristics of Indian Agriculture, Major crops and their distribution: Rice, Wheat, Sugarcane, Cotton, Jute. Mineral and power resource: Distribution and utilization of iron ore, coal, petroleum, gas. Industrial development: Iron & Steel, Automobile and Information technology.

Unit 4: Population: Distribution and growth, Structure.

Essential Reading :

- Deshpande, C. D. (1992). *India: A Regional Interpretation*. ICSSR, New Delhi.
- Hussain, M. (2022). *India and World Geography for Civil Services and Other Competitive Examinations*. McGraw Hill.
- Johnson, B. L. C. (Ed.). (2001). *Geographical Dictionary of India*. Vision Books, New Delhi.
- Khullar, D. R. (2022). *India: A Comprehensive Geography*. Kalyani Publishers.
- Mandal, R. B. (Ed.). (1990). *Patterns of Regional Geography – An International Perspective. Vol.3 – Indian Perspective*.
- Sdyasuk, Galina & Sengupta, P. (1967). *Economic Regionalisation of India*. Census of India.
- Sharma, T. C. (2003). *India - Economic and Commercial Geography*. Vikas Publishing, New Delhi.
- Singh, Savindra (2023). *Physical Geography*. Prayag Pustak Bhawan.

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Paper Title : **Regional Planning and Development**
Course Code : **PAGTC42012**
L-T-P : **3-1-0**
Credits : **04**
Prerequisite Course / Knowledge (If any): **Basic knowledge of Geography**

Course Learning Outcomes (CLOs)

After completion of this course, the students will be able to:

- CLO1.** Explain the basic concept and theoretical basis of region, need for regional planning, types of regional disparities.
- CLO2.** Express and identify the in-depth issues of regional disparity and the need for a balanced regional development in the Indian context.
- CLO3.** Compare the difference between developed and developing regions
- CLO4.** Evaluate the significance of regional planning, various programmes of planning
- CLO5.** Explain the idea of development, theories of regional development

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1		2	
CLO2			1	3	2
CLO3	1	2	3		
CLO4		3		2	1
CLO5		2		1	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Course Content

Unit I: Introduction to Regional Planning and Development (15 hrs.)

Concept of region, types of regions: delineation of regions, physical, cultural, economic, administrative and planning region, Regional Planning: Definition, Objectives, Scope and related issues, Relevance of regional concept in planning and development, Need for regional planning, regional disparity, factors responsible: physical, historical, socio-economic and political, Indicators of development-measurement of levels of development.

Unit II: Regional problems and planning strategies (15 hrs.)

Introduction to regional/economic industrial location theories (Weber, D.M. Smith, August Losch), Regional imbalances and inequalities in India (Policies- its impact on regional imbalances and planning imperatives, agricultural development policies and structural adjustment policies), Urbanisation and urban systems in India, Regional Planning in India: Industrial regions, agro-climatic regions and city regions in India, Identification of regional problems, Regional development strategies, Implementation of policies and plans, Efficacy of regional plans.

Unit III: Housing and Right to the City, Regional-Social Security (15 hrs.)

Housing as social security, role of housing in development of family and community well being, status and prestige related to housing, safety, crime and insecurity, deprivation and social vulnerability, ghettoism, gender issues, housing and the elderly. Contribution of housing to micro and macro economy, contribution to national wealth and GDP, housing taxation, national budgets, fiscal concessions, forward and backward linkages.

Unit IV: Regional hierarchy and Planning for Development (15 hrs.)

Concept of regional hierarchy, Need of regional hierarchy for planning and development, Regional basis of decentralised and multi-level planning in India, Decentralised planning approaches, district planning and block level planning, Applicability of spatial models to regional development, Changing perspectives in regional planning and current status in India. (Case studies, Damodar Valley Corporation, National Capital Region, Narmada Command Area Development Plan, Regional Planning in Rihaad, etc.)

Essential Readings:

- Bhat, L.S.; Regional planning of India, Statistical Publishing society, Calcutta 1973.
- Chandana, R. C. (2000): Regional Planning and Development- A Comprehensive Text, Kalyani Publishers, Ludhiana
- Dube K. N. (ed) (1990): Planning and Development in India, Asia Publishing House, New Delhi.
- Harvey, D. (1973). Social Justice and the City (REV-Revised). University of Georgia Press. <http://www.jstor.org/stable/j.ctt46nm9v>
- Mishra R. P (Ed.) (1992): Regional Planning, Concepts, Techniques, Policies and Case Studies, Concept Pub. New Delhi
- Sundaram, K.V. (1985): Geography and Planning, Concept Publishing Company, New Delhi.

Additional Readings:

- Cook, P. (1983) Theories of Planning and Spatial Development, Hutchinson and Company Ltd. London

- Farhana, I., (2012). The Region and Its Margins: Re-Appropriations of the Border from 'Mahagujarat' to 'Swarnim Gujarat'. Economic and Political Weekly, Vol.32, pp.66-72.
- Friedmann, J Alanson W (1967): Regional Development and planning - A Reader, MIT Press Mass
- Gosal, G.S. and Krishnan, G.(1984): Regional Disparities in Levels of Socio Economic Development in Punjab, Vishal Publications, Kurukshetra,
- Govt. of India (1986), Regional Plan 2001 - National Capital Region, NCRPB, Ministry of Urban Development, New Delhi

Supplementary Readings:

- Alden, J and Morgan, R (1974): Regional Planning: A Comprehensive View, Leonard Hill Books, Beds.
- Choudhary, B. R., (2015). Regionalism in the Era of Globalization: The Case Study of the SAARC in South Asia. The International Journal of Humanities and Social Studies, Vol. 3, No. 7, pp. 80-88.
- Shubramanya, K.N. (ed) (1985): Economic Development and Planning in India, Publications, New Delhi.
- Sundaram K.V., Misra R.P. and Prakasa Rao, V.L.S. (1978): Regional Development Planning in India, Vikas Publishers, New Delhi.


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Paper Title : Dissertation

Course Code : PAGRD42202

Credits : 06

Prerequisite Course / Knowledge (If any): Basic knowledge of Geography and Research

Course Learning Outcomes (CLOs)

By the end of the dissertation, students should be able to:

- CLO1.** Formulate a clear research problem and objectives.
- CLO2.** Conduct a literature review to establish a research gap.
- CLO3.** Select and apply appropriate research methods.
- CLO4.** Collect, analyze, and interpret data systematically.
- CLO5.** Present findings in a structured, academic format.
- CLO6.** Defend their research through a written dissertation and oral presentation.

The MSc Dissertation is a research-based component of the MSc program, allowing students to apply theoretical and methodological knowledge to an independent study. It involves research design, data collection, analysis, and academic writing, leading to a final dissertation report of at least 20000 words (excluding the introductory pages, reference and annexure).

The broad domains suggested for dissertation work.

- 1) Urban Geography and Spatial Planning
- 2) Population Geography: Demographic Trends and Policies
- 3) Health Geography
- 4) Agricultural & Rural Geography
- 5) Geomorphology and Oceanography
- 6) Climatic Change and its Impact on Regional Weather Patterns
- 7) Oceanography and Marine Ecosystem Dynamics
- 8) Migration, Urbanization, and Population Distribution
- 9) Sustainable Development
- 10) Environmental Geography and Conservation Strategies
- 11) Economic Geography: Trade, Industry, and Regional Development

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2		3	2
CLO2	3			2	3
CLO3	2	3	3	2	-
CLO4	1	3	3	3	-
CLO5				2	3
CLO6				2	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.

Paper Title : **Internship**
Course Code : **PAGIC42014**
Credits : **04**
Prerequisite Course / Knowledge (If any): **Basic knowledge of Geography and Research**

Course Learning Outcomes (CLOs)

By the end of the dissertation, students should be able to:

- CLO1.** Apply academic knowledge to real-world problems in industrial and institutional settings.
- CLO2.** Develop technical, analytical, and professional skills through hands-on training and project work.
- CLO3.** Conduct independent research and data analysis, including spatial analysis and fieldwork where applicable.
- CLO4.** Enhance problem-solving and decision-making abilities by working on industry-specific projects.
- CLO5.** Effectively communicate research findings through structured reports, presentations, and viva voce.

The internship program for MSc students is designed to provide practical exposure in industrial and institutional settings, enhancing their technical, analytical, and professional skills. The structure will include Pre-Internship Preparation, Training & Project Work, and Documentation & Reporting.

The Training & Project Work will be for 6-8 weeks involves hands-on learning and real-world problem-solving. The internship has to be completed in the summer vacation after II-Semester of MSc. Students will work on industry-specific projects assigned by their supervisors, applying their academic knowledge to practical scenarios. This will include technical skill development, data collection, spatial analysis, fieldwork (if applicable), and report writing.

Students will conclude their internship by submitting a report of at least 8000 words, delivering a final presentation and viva voce, showcasing their key takeaways and project outcomes.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2		3	2
CLO2	3			2	3
CLO3	2	3	3	2	-
CLO4	1	3	3	3	-
CLO5				2	3
CLO6				2	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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Paper Title : **Field work**

Course Code : **PAGPS42002**

Credits : **02**

Prerequisite Course / Knowledge (If any): **Basic knowledge of Physical and Human Geography**

This course will provide hands-on training in geographical fieldwork methods, data collection, and spatial analysis. Students will develop skills in observation, mapping, and analysis of physical and human landscapes. The course integrates theoretical knowledge with practical experience, emphasizing ethical field practices and report writing.

Course Objectives:

- CLO1. To introduce students to field techniques in physical and human geography.
- CLO2. To develop skills in spatial data collection, mapping, and interpretation.
- CLO3. To analyse geographic phenomena using qualitative and quantitative methods.
- CLO4. To enhance critical thinking and problem-solving skills through field-based investigations.
- CLO5. Prepare structured field reports and presentations.

A study tour/excursion should be conducted either in the end of III Semester or beginning of the IV semester. The course teacher will plan the type of fieldwork and its execution broad domains of fieldwork. The following topics may be considered

- Urbanization and Land Use Change
- Climate Change and Its Impact on Local Ecosystems
- Migration Patterns and Their Impact on Regional Development
- Sustainable Agricultural Practices and Soil Erosion
- Water Scarcity and Management in Rural Area

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs)

	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2		3	2
CLO2	3			2	3
CLO3	2	3	3	2	-
CLO4	1	3	3	3	-
CLO5				2	3

Each Course Learning Outcome (CLOs) may be mapped with one or more Program Learning Outcomes (PLOs). Write '3' in the box for 'High-level' mapping, 2 for 'Medium-level' mapping, 1 for 'Low-level' mapping.


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