தமிழ்நாடு மத்தியப் பல்கலைக்கழகம்

CENTRAL UNIVERSITY OF TAMIL NADU

तमिलनाडु केन्द्रीय विश्वविद्यालय

ESTABLISHED BY AN ACT OF PARLIAMENT IN 2009

Ph.D. GEOGRAPHY PROGRAMME

CURRICULUM STRUCTURE

(From the Academic Year 2025-26 onwards)

Department of Geography

School of Earth Sciences

Central University of Tamil Nadu

Neelakudi, Thiruvarur – 610 005

Email: hodgeo@cutn.ac.in

Phone: 04366 277338

www.cutn.ac.in

Ph.D. PROGRAMME OUTCOMES

On completion of the programme, students will be able to:

- Identifying, interpreting and analysing geographic problems and processes
- Formulating a research methodology and executing formal research projects independently and ethically
- Defending and communicating facts, ideas and research findings via written, oral, graphical and quantitative outlets.
- Contribute knowledge of geography in response to issues in their specialized area

PROGRAMME SPECIFIC OUTCOMES

- To develop original thinking in the field of geography and geospatial sciences
- To carry out independent research of high quality in their specialized area
- To evaluate and suggest optimal measures to solve multi-dimension geographic problems through geospatial techniques
- To able to communicate research findings in various forums at national and international level.

Ph.D. Geography Programme

COURSE WORK STRUCTURE

(from the academic year 2025-26 onwards)

Sl. No	COURSES			ASSESSMENT	
	Code	Title	Credits	CIA	ESE
1	GEO253011	Research Methodology	4	40	60
2	GEO253012	Geographic Data Analytics	4	40	60
3	GEO253013	Research and Publication Ethics	2	40	60
4	**	Any One from the List of Specialized Courses	4	40	60
Total			**14**	**400**	

****LIST OF SPECIALIZED COURSES**

Course Code	Course Name
GEO253014	Applied Geomorphology
GEO253015	Climate Change and Adaptation
GEO253016	Coastal Zone Management
GEO253017	Demography and Migration
GEO253018	Disaster Risk Reduction
GEO253019	Environmental Impact Assessment
GEO253020	Integrated Watershed Management
GEO253021	Regional Development
GEO253022	Remote Sensing Time Series Analysis
GEO253023	Spatial Decision Support System
GEO253024	Spatial Epidemiology
GEO253025	Spatial Intelligence and Big Data Analytics
GEO253026	Sustainable Tourism
GEO253027	Sustainable Livelihoods
GEO253028	Urban Planning and Smart Cities
GEO253029	Urban Sustainability
GEO253030	Wetland Management

Credits: 4 Course Code: GEO253011

RESEARCH METHODOLOGY

Learning Outcomes

After completion of this course, the research scholar will able to

1. *understand the scientific way of conducting geographical research*
2. *identify appropriate research designs and methodologies for different research questions*
3. *formulate clear, concise, and testable research questions and demonstrate rigor, and integrity in the research process*
4. *organize and present research findings in written formats*

Unit – I

Research Basics

Fundamental research concepts - Scientific approach to geography – Epistemological frameworks - Concept of scale in geography

Unit – II

Literature Review

Importance of literature review - Types of Reviews: narrative, systematic, scoping, and meta-analytic reviews - Categorizing Literature: Thematic, chronological, methodological grouping - Academic search strategies: keyword planning, Boolean search techniques - Defining a research gap

Unit – III

Research Design

Formulating research problem, objectives, hypotheses and questions – Basic principles in research design - Experimental and non-experimental research designs - Sampling design

Unit – IV

Data Generation

Methods of data collection - Data collection in geography - Geospatial data collection for geographical research - Reliability and validity of data

Unit – V

Research Reporting

Structure and components of scientific reports – Structuring a research proposal - Scientific Communication

Internal Assessment Weightage

- Literature review paper (25%)

- Presentation on selected methodology (25%)

- Research proposal (50%)

REFERENCES:

1. Daniel M., Paul S. (2013) An Introduction to Scientific Research Methods in Geography and Environmental Studies, SAGE Publications Ltd.
2. Basil Gomez, John Paul J. (2010) Research Methods in Geography - A Critical Introduction, John Wiley & Sons Ltd.
3. Nicholas C., Meghan C., Thomas G, Shaun F. (2016) Key Methods in Geography, SAGE Publications Ltd.
4. Ranjit Kumar (2014) Research Methodology - A Step-by-Step Guide for Beginners, SAGE Publications Ltd.

Mapping of Program Outcomes with Course Outcomes:

	PO1	PO2	PO3	PO4
CO1	x			
CO2	x	x		
CO3		x	x	
CO4			x	x

Credits: 4 Course Code: GEO253012

GEOGRAPHIC DATA ANALYTICS

Learning Outcomes

After completion of this course, the research scholar will able to

1. *engage with the quantitative methods used to collect, analyze, present and interpret geographical data*
2. *appreciate various spatial and statistical methods in analyzing geographical data including the application of geospatial techniques*
3. *demonstrate advanced spatial statistical methods, techniques and software packages*

Unit –I

Quantitative Data Analysis

Use and Abuse of Statistics - Principles of Statistics - Statistical Methods for Geography - Descriptive Statistics - Probability: Discrete and Continuous Probability Distributions - Probability Models - Inferential Statistics: Confidence Intervals, Hypothesis Testing and Sampling

Unit –II

Advanced Statistical Techniques

Analysis of Variance - Correlation - Regression Analysis - Spatial Patterns - Data Reduction: Factor Analysis and Cluster Analysis - Spatial Autocorrelation - An Introduction to R

Unit –III

Spatial Analysis

Gravity and Potential Models - Network Analysis - Location-Allocation Models - Trend Surface Analysis - Spatio-Temporal Analysis - Geodemographic Analysis - Spatial Interaction Models

Unit – IV

Geocomputation

Remote Sensing, GIS and GNSS in Geography Research: Mapping, Spatial Analysis and Modelling, Change Detection Analysis

Unit – V

GIS Overlay

Weighted Overlay Functions - Multi-Criteria Evaluation: AHP, Satty Scale, Fuzzy AHP - Spatial Decision Support System.

REFERENCES:

1. Rogerson, P.A. (2014) Statistical Methods for Geography - A Student's Guide, SAGE Publications Ltd
2. Harris R. (2016) Quantitative Geography - The Basics, SAGE Publications Ltd
3. Jacek Malczewski (1999) GIS and Multicriteria Decision analysis, John Wiley & Sons, Inc, New York.
4. Ningchuan Xiao (2015) GIS Algorithms, SAGE Publications Ltd
5. Chris B., Alex S. (2015) Geocomputation - A Practical Primer, SAGE Publications Ltd
6. Minshull, R. (1975) Introduction to Models in Geography, Longman.
7. Najma Khan, (1998): Quantitative Methods in Geographical Research, Concept Publishing Company, New Delhi.
8. David W. Allen, (2011). GIS Tutorial 2: Spatial Analysis Workbook for ArcGIS10, ESRI Press, Red Lands, USA.
9. Andy Mitchell, (1999). GIS Analysis - Volume 1: Geographic Patterns and Relationships, ESRI Press, Red Lands, USA.
10. Andy Mitchell, (2009). GIS Analysis - Volume 2: Spatial Measurements and Statistics, ESRI Press, Red Lands, USA.
11. Abler, R., Adams, J. S., and Gould, P., (1971). Spatial organization: The geographer's view of the World, Englewood Cliffs, N.J., Prentice-Hall. Englewood Cliffs.
12. Tsung Chang Kang, (2002). Introduction to Geographic Information Systems, Tata McGraw-Hill Publishing Company Limited, New Delhi.

Mapping of Program Outcomes with Course Outcomes:

	PO1	**PO2**	**PO3**	**PO4**
CO1	x	x		
CO2	x	x	x	
CO3			x	x

Credits: 2 Course Code: GEO253013

RESEARCH AND PUBLICATION ETHICS

Learning Outcomes

After completion of this course, the research scholar will able to

1. *understand the basics of philosophy of science and ethics, research integrity, and publication ethics*
2. *identify research misconduct and predatory publications*
3. *demonstrate indexing and citation databases, open access publications, research metrics (citations, h-index, impact factor, etc.) and plagiarism tools*

Unit – I

Philosophy and Ethics

Introduction to Philosophy: definition, nature and scope, concept, branches - Ethics: Definition, moral philosophy, nature of moral judgments and reactions.

Unit – II

Scientific Conduct

Ethics with respect to science and research - Intellectual honesty and research integrity - Scientific misconducts: Falsification, Fabrication and Plagiarism (FFP) - Redundant publications - Selective reporting and misrepresentation of data

Unit – III

Publication Ethics

Publication ethics - Best practices/standards setting initiatives and guidelines - Conflicts of interest - Publication misconduct - Violation of publication ethics - Identification of publication misconduct - Predatory publishers and journals

Unit – IV

Open Access Publishing

Open access publications and initiatives - Software tool to identify predatory publications - Journal finder/journal suggestion tools (JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.)

Unit – V

Databases and Research Metrics

Indexing databases - Citation databases: Web of Science, Scopus - Reference management software: Mendeley, Zotero - Anti-plagiarism software: Turnitin - Research Metrics - Impact factor of journal: Journal Citation Report, SNIP, SJR, IPP, CiteScore Metrics: h-index, g-index, i-10 index

REFERENCES

1. Alexander Bird (2006). Philosophy of Science. Routledge
2. Resnik DB (2005). The Ethics of Science–An Introduction. Taylor & Francis-elibrary
3. INSA, Ethics in Science Education, Research and Governance. https://www.insaindia.res.in/pdf/Ethics_Book.pdf
4. Chaddah, P. (2019). Ethics in Competitive Research: Do not get scooped, do not get plagiarized. https://www.researchgate.net/publication/331470963_Ethics_in_Competitive_Research_Do_not_get_scooped_do_not_get_plagiarized
5. David B. Resnik (2020). What Is Ethics in Research & Why Is It Important? https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm
6. Jeffrey Beall (2012). Predatory publishers are corrupting open access. Nature, 489, 179. https://www.nature.com/news/predatory-publishers-are-corrupting-open-access-1.11385

Mapping of Program Outcomes with Course Outcomes:

	PO1	PO2	PO3	PO4
CO1		x	x	
CO2		x	x	
CO3			x	x

Credits: 4

SPECIALIZED COURSE

Research scholar needs to select **any one** of the specialized courses from the pool of courses offered by the Department (listed below) in consultation with the supervisor. Based on the field of interest of the candidate and recent research trends in the field, concerned research supervisor will prepare a syllabus before the commencement of the course.

After completion of this course, the research scholar will able to demonstrate a sound understanding of the field of study and design appropriate research methods.

Course Code	Course Name
GEO253014	Applied Geomorphology
GEO253015	Climate Change and Adaptation
GEO253016	Coastal Zone Management
GEO253017	Demography and Migration
GEO253018	Disaster Risk Reduction
GEO253019	Environmental Impact Assessment
GEO253020	Integrated Watershed Management
GEO253021	Regional Development
GEO253022	Remote Sensing Time Series Analysis
GEO253023	Spatial Decision Support System
GEO253024	Spatial Epidemiology
GEO253025	Spatial Intelligence and Big Data Analytics
GEO253026	Sustainable Tourism
GEO253027	Sustainable Livelihoods
GEO253028	Urban Planning and Smart Cities
GEO253029	Urban Sustainability
GEO253030	Wetland Management