

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 2023-24 Onwards)

Department of Geography
School of Earth Sciences
Central University of Tamil Nadu
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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

CURRICULUM STRUCTURE

(from the academic year 2023-24 onwards)

Sl. No	COURSES			ASSESSMENT	
	Code	Title	Credits	CIA	ESE
1	GEO3011	Research Methodology	4	40	60
2	GEO3012	Geographic Data Analytics	4	40	60
3	GEO3013	Research and Publication Ethics	2	40	60
4		Any One from the List Given Below	4	40	60
Total			14	400	

LIST OF ELECTIVE COURSES

GEO3014	Applied Geomorphology
GEO3015	Applied Climatology
GEO3016	Integrated Watershed Management
GEO3017	Biodiversity and Conservation
GEO3018	Environmental Impact Assessment
GEO3019	Coastal Zone Management
GEO3020	Disaster Risk and Vulnerability
GEO3021	Land Evaluation and Land Use Planning
GEO3022	Precision Agriculture
GEO3023	Environmental Changes, Health and Wellbeing
GEO3024	Demography and Social Wellbeing
GEO3025	Urban Sustainability in Mega Cities
GEO3026	Urban Planning and Smart Cities
GEO3027	Rural and Regional Development
GEO3028	Energy Resources
GEO3029	Location Analytics
GEO3030	Hyperspectral Remote Sensing
GEO3031	Microwave Remote Sensing
GEO3032	Spatial Decision Support System
GEO3033	WebGIS
GEO3034	Sustainable Tourism
GEO3035	Climate Change and Human Health
GEO3036	Wetland Management
GEO3037	Microplastics Pollution
GEO3038	Remote Sensing Time Series Analysis



PART - I

Credits: 4

Course Code: GEO3011

RESEARCH METHODOLOGY

Learning Outcomes

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

- 1. understand the scientific way of conducting geographical research and design own research plan and methods*
- 2. collect and appreciate various approaches to analyse the data*
- 3. carry out a literature review in relation to their field of specialization*
- 4. able to present the results in the form of a thesis with appropriate structure and formats*

Unit – I

Research Basics

Fundamental research concepts - Scientific approach to geography –Formulating research problem, objectives and questions – Importance of literature review - Concept of scale in geography

Unit – II

Research Design

Basic principles in research design - Experimental and nonexperimental research designs - Selecting a method of data collection - Sampling design

Unit – III

Data Generation

Data collection in geography - Physical measurements - Behavioural observations - Archives and reports - Surveys, interviews and tests - Reliability and validity of data

Unit – IV

Research Reporting

Structure and components of scientific reports – Writing a research proposal - Scientific Communication in Geography - Geospatial technologies in geographical research

Unit – V

Project Work

Structuring a research design – Drafting a literature review with suitable formatting and citation – Checking Plagiarism – Reporting a case study



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.
5. Mishra R.P., (1998): Research Methodology: A Handbook (Revised and Enlarged Edition) (2016), Concept Publishing Company, New Delhi.
6. MLA Handbook (2016), Modern Language Association
7. Cook C.K. (1985) Line by Line: How to Edit Your Own Writing, Modern Language Association

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: GEO3012

GEOGRAPHIC DATA ANALYTICS

Learning Outcomes

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

- 1. engage with the quantitative methods used to collect, analyse, 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 Modeling, 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: GEO3013

RESEARCH AND PUBLICATION ETHICS

Learning Outcomes

After completion of this course, the research scholar will be 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 - SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies - Software tool to identify predatory publications developed by SPPU: UGC-CARE list of journals - 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 etc. reference management software like Mendeley, Zotero etc. and anti-plagiarism software like Turnitin, Urkund - Research Metrics - Impact factor of journal as per 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

ELECTIVE COURSE

Research scholar needs to select **any one** of the elective course from the pool of elective 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 elective course, the research scholar will able to demonstrates a sound understanding of the field of study and the appropriate research methods

Course Code	Course Name
GEO3014	Applied Geomorphology
GEO3015	Applied Climatology
GEO3016	Integrated Watershed Management
GEO3017	Biodiversity and Conservation
GEO3018	Environmental Impact Assessment
GEO3019	Coastal Zone Management
GEO3020	Disaster Risk and Vulnerability
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GEO3038	Remote Sensing Time Series Analysis



PART-II

DISSERTATION AND VIVA-VOCE

After completion of approved course work, scholars will work independently on specialized problems related to the research interests of the respective supervisor. They will also need to prepare and submit a thesis within in the stipulated time period which will be evaluated by the supervisor and external examiner(s) and need to defend the thesis in a public viva-voce. A successful thesis should represent the result of the candidate's research which should be an original contribution to knowledge and worthy of publication.

Please refer to the UGC/University guidelines for details of the regulations for Ph.D. Dissertation.