



SYLLABUS OF COURSE WORK FOR PH. D PROGRAMME

Interdisciplinary Research in Science
Affiliated to Vidyasagar University

Subject - Geography

**Department of Geography
Panskura Banamali College (Autonomous)
Panskura R S: Purba Medinipur
West Bengal- 721152**

**Syllabus for the course work of Ph.D. programme
Panskura Banamali College Research Centre
(Interdisciplinary Research in Science)**

- **Duration of the course work: One Semester (6 months)**
- **Total paper – 4 (Four): Total Credit – 16**
- **Total Marks – 200 (Four papers 50 marks each)**
- **Duration of Examination – Two hours each paper**

Syllabus structure of course work for Ph. D programme

Course	Paper	Subject	Credit	Full Marks	Total Lecture
Compulsory	I	Research Methodology	4	50	40
	II	Unit -I A. Basics of Computer Application B. Language Skill Development Unit –II A. Fundamentals of Statistics B. Computer Application	4	50	40
Elective	III	Methodologies in Geography	4	50	40
Review and Project work	IV	A. Review work B. Project work <i>(Each student must submitted the report duly signed by the Project Supervisor assigned by the Research Centre)</i>	4	50	40

Syllabus for the course work of Ph.D. programme
Panskura Banamali College Research Centre

Paper-I

Research Methodology

(Each unit 5 lectures)

50 marks

- i. **Scientific Process:** Science and its methods---- Observation, Experiment, Inference. Limitations of experiment. Comparative method. Physical, Biological and Social Science
- ii. **Research Methodology:** Definition, Method, technique and Methodology. Inductive and Deductive Method. Types of research--- Exploratory Research, Hypothesis testing Research, Correlational Research.
- iii. **Research design:** Definition. Steps of Research Design. Types of Research Design. Building blocks of research: Concept, Proposition, Hypothesis, Theory and Law. Variable. Types of variables: Independent and Dependent variables. Continuous and Discrete variables.
- iv. **Sampling designs:** Definition of sample and population. Definition of survey. Census: Definition and utility. Probability: definition, probability rules. Probability and samples. Standard deviation and Standard Error.
- v. **Editing, Data collection and Validation:** Primary and secondary data, methods of collecting primary and secondary data, importance and methods of editing and data validation. Methods for developing a structured questionnaire and guideline for questionnaire survey. Experimental based data generation.
- vi. **Hypothesis:** Definition, testing of hypothesis, procedures of hypothesis testing, flow diagram for hypothesis testing, parametric and non-parametric tests for testing of hypothesis, limitations of hypothesis.
- vii. **Paper / Thesis Writing and Report generations:** Basic concepts of paper their writing and report generation, review of literature, concepts of Bibliography and References, significance of report writing, steps of report writing, types of research report, methods of representation of report. Code of ethics, permission to research, responsibilities, confidentiality, concept of plagiarism.
- viii. **Instrumentation:** Description and principles of (a) Electrophoresis, (b) PCR Machine, (c) Laminar flow (d) Ultracentrifuge (e) Autoclave, (f) Light and electron microscopy. Handling of instruments and precautions.
- ix. **Laboratory Safety:** Introduction, Code of conduct – while entering in the laboratory, while working with chemicals, disposal of chemicals; Storage and disposal of chemical waste, organic and radioactive wastes. Human contribution to reduce hazardous wastes.
- x. **Field safety:** Definition of Fieldwork. Distinction between Fieldwork and Laboratory Experiment. Security during field trip / expedition, self-care, cares from wild animals, hazard warnings. Precautions during visit to library and other offices. First aid in the fields.

Paper II

Computer Application, Statistical Methods and Skill Development Full Marks -50

Unit – I (Theory)

A. Basics of Computer (5 Lectures)

Number system - binary, octal and hexadecimal, base conversion. Numbers: Integers, functional numbers of presentation, power, large numbers, small numbers, round off, approximation.

B. Language Skill Development for Scientific Paper Writing and Editing (5 Lectures)

Basic grammar, Functional grammar through usage and practice,

Passage reading and understanding

Dictation for flawless writing and new vocabulary based activity

Phonology, Word tree-word cycle, Report writing-editing, Paragraph-Summary, gist, notes making, Mouth exercise, Telephone Conversation, Computer Typing.

Unit – II

A. Fundamentals of Statistics (15 Lectures)

1. Probability Distribution Samples and Population, Statistics and Parameters, Random Sampling, Measurement of Central Tendencies, Measures of Variations.
2. Correlation Coefficient: Simpler linear, multiple linear and partial regression
3. Probability distributions: Normal, Binomial and Poisson.
4. Statistical Inference, Testing Hypothesis: Student 't' test, 'f' test, Chi Square tests.
Correlation, Regression, Time series and Panel data analysis, Basic operation of Matrix and Determinants, ANOVA

B. Computer Application (15 Lectures) (Practical / Assignment)

1. Use of software – Linux, Windows: MS Office - Power Point, Word, Excel and Access, LATEX/WINEDT.
2. Software Packages: MATLAB, MATPLOTLIB, SPSS and R.
3. Data uploading and downloading, INFLIBNET, Sodhganga. E-journal.

Suggested readings (for Paper – I & II)

- 1** Brunson C, Comber. L, (2018) An Introduction to R for Spatial Analysis and Mapping (Second Edition), SAGE publishing.
- 2** Guthier, G (2010), Basic Research Methods, An Entry to Social Science Research, SAGE publishing.
- 3** Burkholder G J, Cox K A, Crawford L M, Hitchcock J H, (2014), Research Design and Methods: An Applied Guide for the Scholar-Practitioner, SAGE publishing.
- 4** Kothari C. R., (2004). Research Methodology: Methods and Techniques, New Age International Pvt Ltd Publishers.
- 5** Chawla D and Sondhi N, Research Methodology Concepts and Cases, Vikas Publishing House Pvt. Ltd.-Noida, 2011.
- 6** Goon, A.M., Gupta, M.K. and Dasgupta, B. (2005): Fundamentals of Statistics, The World Press Private Limited.
- 7** Wilkinson and Bhandarkar, Methodology and Techniques of Social Research, Himalaya Publishing House.
- 8** Silberschatz G, Operating System Concepts, Wiley Publishers.
- 9** Tickell A, Sheppard E, Peck J and Barnes T (2007), Politics and Practice in Economic Geography, SAGE publishing.
- 10** Fuscaldo, AA, Erlick, BI, Hindman, B. Laboratory Safety: Theory and Practice. New York: Academic Press, 1980.
- 11** Blum, Deborah and Mary Knudson, eds. A field guide for science writers: the official guide of the National Association of Science Writers, New York: Oxford University Press, 1997.
- 12** Booth, Wayne, Gregory G Colomb, Joseph M. Williams. The craft of Research Chicago University of Chicago Press, 1995.

Paper – III
Elective Paper- Geography
50 marks
(40 Lectures)

1. Man and Environment: Man-nature relationship, environmental hazard and mitigation strategies. **(5)**
2. Climate and development: Climate change at global and local scale, climate and sustainable development. **(5)**
3. Regional development: Agriculture and industry, causes of imbalances, process and methods of development. **(5)**
4. Social development: Indicators and techniques of development for health and education. **(5)**
5. Gender and development: Regional dimension analysis with special reference to India. **(5)**
6. Human development: Importance, indicators, method of calculation. **(5)**
7. Urban analysis: Methods of urban analysis. **(5)**
8. Geospatial techniques: Applications of RS & GIS in Geoscience research. **(5)**

Suggested Reading:

- 1 Rogerson P A. (2018) Statistical Methods for Geography: A Student's Guide (Fifth Edition), SAGE publishing.
- 2 Brunsdon C, Comber. L, (2018) An Introduction to R for Spatial Analysis and Mapping (Second Edition), SAGE publishing.
- 3 Clifford N, Cope M, Gillespie T, French S, (2016) Key Methods in Geography (Third Edition) SAGE publishing.
- 4 Montello D, Sutton P, (2012), An Introduction to Scientific Research Methods in Geography and Environmental Studies (Second Edition) SAGE publishing.
- 5 Baxter J., Eyles J, (2004) Evaluating Qualitative Research in Social Geography: Establishing 'Rigour' in Interview Analysis, John Wiley & Sons.
- 6 Misra H.N., Singh V P, (Eds) (2006) Research methodology in geography: social, spatial and policy dimensions, Rawat publications.
- 7 Murthy, K L N (2014) Research Methodology in Geography, Concept Publishing Company.
- 8 Guthier, G (2010), Basic Research Methods, An Entry to Social Science Research, SAGE publishing.
- 9 Gomez B, Jones J P, Jones III (2010), Research Methods in Geography: A Critical Introduction, John Wiley & Sons.

- 10 Kitchin R, Tate N J, (2000), *Conducting Research in Human Geography: Theory, Methodology and Practice*, Prentice Hall.
- 11 Flowerdew R, Martin D, (2005), *Methods in Human Geography: A guide for students doing a research project*, 2nd edition, Taylor & Francis.
- 12 Tickell A, Sheppard E, Peck J and Barnes T (2007), *Politics and Practice in Economic Geography*, SAGE publishing.
- 13 Kothari C. R., (2004). *Research Methodology: Methods and Techniques*, New Age International Pvt Ltd Publishers.
14. Burkholder G J, Cox K A, Crawford L M, Hitchcock J H, (2014), *Research Design and Methods: An Applied Guide for the Scholar-Practitioner*, SAGE publishing.
15. Vincent J. Del Casino Jr. Mary E. Thomas Paul Cloke Ruth Panelli (2011), *A Companion to Social Geography*, John Wiley & Sons.
16. Michael Pacione (2013), *Social Geography: Progress and Prospect*, Routledge.
17. Andy Pike, Andrés Rodríguez-Pose and John Tomaney, (2003), *Local and Regional Development*, Routledge.
18. Bairoch, P. (1988), *Cities and Economics Development: From the Dawn of History to the Present*. Chicago: University of Chicago Press.
19. McCann G, McCloskey S, (2015), *Key Issues in Development Studies*, Rawat Publications.
20. Preston P.W, (2011), *Theories of Development*, Routledge.
21. Herod A, (2012), *Geographies of Globalization: A Critical Introduction*, Wiley Blackwell.
22. Paul H, (2012), *Understanding Development*, Polity.
23. Floyd F. Sabins, (1996), *Remote Sensing Laboratory Manual*, Kendall Hunt Pub Co.
24. George Joseph and C. Jeganathan, (2018), *Fundamentals of Remote Sensing*, Universities Press Pvt. Ltd.
25. Thomas Lillesand, Ralph W. Kiefer, (1979), *Remote Sensing and Image Interpretation*. Wiley

Paper – IV
Review and Project Work
Marks – 50 (Each unit 10 marks)

A. Review Work

Review work must have submitted in hard copy - A4 size paper, MS word format, 12 fonts, single side print, 1.5-line spacing)

3.1 Book review: One national and one international book related to the proposed research area.

3.2 International Journal review: Two international journal articles related to the proposed research area.

3.3 National Journal review: Two referred Indian journal articles related to the proposed research area.

B. Project Work

3.4 Submission of project proposal: Submission of project report in the format as – Issue / Background information, problem statement, objectives, hypothesis, rationale, methodology, scheme of the study, literature review and references (*Student have to submit hard copy spiral binding - A4 size paper, MS word format, 12 fonts, single side print, 1.5-line spacing, maximum 50 pages and a soft copy in .pdf format*).

3.5 Presentation of Project work: Power Point Presentation of project report containing Issue / Background information, problem statement, objectives, hypothesis, rationale, methodology, scheme of the study, literature review and references (*within 15 slides*).