GURU KASHI UNIVERSITY

Doctor of Philosophy

Session: 2025-26

Department of Civil Engineering

Faculty of Engineering & Technology

	Program Structure									
Sr. No.	**Course Code**	**Course Title**	**Course Type**	**L**	**T**	**P**	**Credits**	**Internal**	**External**	**Total Marks**
1	PPH101	Research Methodology	Core	4	0	0	4	30	70	100
2	PPH102	Research and Publication Ethics	Core	2	0	0	2	30	70	100
3	PPH104	Computer Applications in Research	Skill Based	0	0	4	2	30	70	100
4	PPH139	Recent Advances in Civil Engineering	Core	4	0	0	4	30	70	100
Total				**10**	**0**	**4**	**12**	**120**	**280**	**400**

Course Title: Research Methodology Course Code: PPH101

L	T	P	Credits
4	0	0	4

Total Hours: 60

Learning Outcomes

On the completion of the course the students will be able to

1. Formulate research problems by conducting comprehensive literature reviews utilizing web sources
2. Apply appropriate research design choices based on research questions and objectives.
3. Explore the integration of qualitative and quantitative data and the concept of triangulation and complementarily of data sources.
4. Utilize statistical software packages commonly used in research for importing, managing, cleaning, and analyzing data.
5. Apply different statistical techniques to summarize and analyze data effectively.

Course Content

Unit-I **15 Hours**

Introduction to Research

Meaning, Objectives, Characteristics, Significance and Types of Research.

Understanding a Research Problem, Literature Review, Methods and Reporting, Selecting the Research Problem, Steps in Formulation of a Research Problem,

Unit-II **15 Hours**

Research Process and Hypothesis

Constructing Hypotheses; Conceptualizing a Research Design-Meaning and Types of Research Design.

Parametric and Non-Parametric Test, Errors and Level of

Significance.

Completely randomized design, Random block design, Latin square design, Statistical analysis.
Components of time series, Analysis of time series, Measurement of trend, Measurement of seasonal variations.

Unit-III **15 Hours**

Sampling Design and Data Analysis

Sampling Techniques-Probability and Non-Probability, Qualities of a good Sample, Sample Size and its Determination.

Introduction to Qualitative, Quantitative and Mixed Methods, Quantitative Methods- Univariate, Bivariate and Multivariate, Qualitative Methods-Grounded Theory and Triangulations, Mixed Methods- Convergent Parallel, Explanatory

Sequential, Exploratory Sequential and Transformative.

Implementation of statistical techniques using statistical packages viz. SPSS R including evaluation of statistical parameters and data interpretation, Regression Analysis, Covariance, analysis of variance.

Unit-IV **15 Hours**

Report Writing

Types of Reports- technical and Popular Reports, Significance of Report Writing, Different Steps in Writing Report, Art of Writing Research Proposals, Research Papers, Projects Reports and Thesis; Basics of Citation and Bibliography/Reference Preparation Styles; Report Presentation: Oral and Poster Presentations of Research Reports.

Suggested Reading

1. Gupta, S. (2010). *Research Methodology and Statistical Techniques*. Deep & Deep Publications (P) Limited, New Delhi.
2. Kothari, C.R., Garg, G. (2019). *Research Methodology: Methods and Techniques.* 4th Edition, New Age International (p) Limited. New Delhi.
3. Sahay, Vinaya and Pradumna Singh (2009). *Encyclopedia of Research Methodology in Life Sciences.* Anmol Publications. New Delhi.
4. Kauda J. (2012). *Research Methodology: A Project Guide for University Students*. Samfunds literature Publications.
5. Dharmapalan B. (2012). *Scientific Research Methodology*. Narosa Publishing

Course Title: Research and Publication Ethics Course Code: PPH102

L	T	P	Credits
2	0	0	2

Total Hours 30

Learning Outcomes

On the completion of the course the students will be able to

1. To have awareness about the publication ethics and publication misconducts.
2. To understand indexing and citation databases, open access publications, research metrics (citations, h-index, impact factor etc)
3. Develop hands-on skills to identify research misconduct and predatory publications.

Course Content

- **RPE 01: PHILOSOPHY AND ETHICS (3 Hrs.)**

  1. Introduction to philosophy: definition, nature and scope, concept, branches
  2. Ethics: definition, moral philosophy, nature of moral judgements and reactions

- **RPE 02: SCIENTIFICCONDUCT (5 Hrs.)**
  1. Ethics with respect to science and research
  2. Intellectual honesty and research integrity
  3. Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP)
  4. Redundant publications: duplicate and overlapping publications, salami slicing
  5. Selective reporting and misrepresentation of data

- **RPE 03: PUBLICATION ETHICS (7 Hrs.)**

  1. Publication ethics: definition, introduction and importance

2. Best practices / standards setting initiatives and guidelines: COPE, WAME, etc.
3. Conflicts of interest
4. Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa, types
5. Violation of publication ethics, authorship and contributorship
6. Identification of publication misconduct, complaints and appeals
7. Predatory publishers and journals

PRACTICE

- **RPE 04: OPEN ACCESS PUBLISHING (4 Hrs.)**
  1. Open access publications and initiatives
  2. SHERPA/ROMEO online resource to check publisher copyright & self- archiving policies
  3. Software tool to identify predatory publications developed by SPPU
  4. Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.

- **RPE 05: PUBLICATION MISCONDUCT (4 Hrs.)**

A. Group Discussions (2 hrs.)

1. Subject specific ethical issues, FFP, authorship
2. Conflicts of interest
3. Complaints and appeals: examples and fraud from India and abroad

B. Software tools (2 hrs.)

Use of plagiarism software like Turnitin, Urkund and other open source software tools

- **RPE 06: DATABASES AND RESEARCH METRICS (7 Hrs.)**

A. Databases (4 hrs.)

1. Indexing databases
2. Citation databases: Web of Science, Scopus etc.

B. Research Metrics (3 hrs.)

1. Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score
2. Metrics: h-index, g-index, i10 index, altmetrics

Suggested Readings

1. Bird, A. (2006). Philosophy of Science. Routledge.
2. MacIntyre, A. (1967) A Short History of Ethics. London.
3. P. Chaddah, (2018) Ethics in Competitive Research: Do not get scooped; do not get plagiarized, ISBN:978-9387480865
4. National Academy of Sciences, National Academy of Engineering and Institute of Medicine. (2009). On Being a Scientist: A Guide to Responsible Conduct in Research: Third Edition. National Academies Press.
5. Rensik, D. B. (2011). What is ethics in research & why is it important. National Institute of Environmental Health Sciences, 1-10. Retrieved from https://www.niehs.nih.gov/resources/biothics/whatis/index.cfm
6. Beall, J. (2012). Predatory publishers are corrupting open access. Nature, 489(7415), 179-179.

https://doi.org/10.1038/489179a

Course Title: Computer Applications in Research Course Code: PPH104

L	T	P	Credits
0	0	4	2

Total Hours 30

Learning Outcomes

On the completion of the course the students will be able to

1. The students will become familiar with the usage of software for managing the reference.
2. To make literature reviews easily.
3. To make reference management by using open software.

Course Content

Unit -I **06 Hours**

MS Word Essentials- Create a document with styled headings and subheadings, Add headers, footers, and page numbers, Adjust page layout settings (margins, orientation, page size).

Table Creation and Management- Insert, format, and style tables, Adjust cell size, merge/split cells, and sort/filter data.

Working with Graphics- Insert and format images, shapes, SmartArt, and text boxes, Apply text wrapping around objects.

Unit-II **08 Hours**

Basics of PowerPoint- Slide layouts, themes, and templates, Adding multimedia: Images, audio, and videos.

Advanced Techniques- Animations and transitions for visual effects, Slide master for consistent formatting, Interactive elements: Hyperlinks and action buttons.

Design Best Practices- Typography, color schemes, and visual hierarchy, Tips for engaging presentations.

Unit -III **08 Hours**

Introduction to Mendeley- Installing and setting up Mendeley Desktop and Web, Importing references from various sources.

Organizing References- Creating folders and tagging references, Annotating and highlighting PDFs.

Citations and Bibliography- Integrating Mendeley with MS Word, using citation styles (APA, MLA, Chicago), Generating a bibliography automatically.

Unit -IV **08 Hours**

AI Tools for Productivity- Text-Based AI Tools (e.g., ChatGPT) Writing assistance, summarization, and brainstorming, Grammar and style checking, Image and Design Tools, Speech and Audio Tools

Suggested Readings

1) Office 2007 in Simple Steps, Kogent Solutions, (Wiley Publishers).
2) MS-Office 2007 Training Guide, S. Jain (BPB Publications).
3) Computer Fundamentals by P.K. Sinha (BPB Publications).
4) https://www.mendeley.com/reference-management/reference-manager
5) https://chat.openai.com
6) https://edu.google.com/workspace-for-education/classroom/

Course: Recent Advances in Civil Engineering

Course Code:- (PPH139)

L	T	P	Credits
4	0	0	4

Total Hours 60

Course Outcomes: On successful completion of this course, the students will able to:

CO Statement

CO1 To develop understanding of Civil Engineering Construction Materials

CO2 To develop an understanding Different types of safety measures at a Construction Site

CO3 To develop an understanding of different types of Surveying Techniques.

CO4 To develop an understanding of different types of smart Materials

CO5 To develop an understanding of design of various types of Bridges

Course Contents

Unit-I

Construction Materials: Introduction of Concrete materials, Admixtures, Fly Ash, Polymers,

Early Age Properties, Strength, Permeability & Durability. Types and properties of construction

materials, Structure of Cement, Strength of cement concrete.

Cement Concrete: Durability of cement concrete, Mix design as per IS-10262, High

performance concrete, Light weight concrete, Fiber reinforced concrete, Polymer concrete, High

density concrete, Foam concrete, Concrete making materials- (both mineral and chemical).

Laboratory testing of Concrete, Roller Compacted Concrete, Self Compacting Concrete and

Reactive Powder Concrete.

Unit-II

Construction Quality Construction Quality, Inspection and Testing, Quality Control, Quality

Assurance, Total Quality Management, , Benchmarking, concepts of quality policy, standards,

manual, third party certification. Safety laws and standards. Safety Hazards and cost

effectiveness.

Structural Safety: Safety Management in Construction Industry, Cause of deterioration of

concrete structures, Diagnostic methods & analysis, preliminary investigations, experimental

investigations using NDT, load testing, and other instrumental methods, Influence on

Serviceability and Durability, Maintenance and Repair Strategies, Materials for Repair,

Techniques for Repair,- case studies, Concepts of structural safety.

Unit-III

Smart Materials: Review of design philosophy, Concrete as construction material, mix design

of light weight concrete, Introduction to Composite and smart materials, classifications and

applications, Anisotropic elasticity, thermo–mechanical properties, micro – mechanical analysis, characterization tests. Classical composite lamination theory. Lamina failure theories,

Ferrocement, cracking moment and design of Ferrocement elements under tension, Fibre reinforced concrete, polymers in concrete, RPC,SCC,FRSCC and whisper concrete.

Designs: High density and high strength concrete. Repair and Seismic Strengthening of

Buildings as per I.S. 13935-1993. Design and Ductile Detailing of R.C.C. Structures as per I.S.

13920-1993. Properties and technique of construction for concrete. Finite Element/ Analytical

Modeling.

Bridges: Investigation for Bridges, Standard Specifications for Road Bridges, Reinforced

Concrete Bridges, Steel Bridges, Construction and Maintenance of Bridges.

Unit-IV

Surveying: Remote sensing and geographic information system, modern theodolite, total

station, auto level, principle of remote sensing, various remote sensors, storing of information as theme layers.

Environment: Environment & Ecology, Type of Pollutants and Protection of Environment,

Current issues in Environmental Engineering, Acts/Legislation Provisions, Environmental

Impact Assessment, Application of Biotechnology for Environmental Management.

Pavement Design: Introduction, Design of Flexible Pavements, Design of Rigid Pavements,

Highway Construction, Highway Maintenance.

Readings:

1. “Concrete Technology” - Theory and Practice, M.S.Shetty, S.Chand and Company, New Delhi

2. “Properties of Concrete”-Neville, A.M. : , ELBS, London

3. “Reinforced concrete Design”-by Pallai and Menon, TMH Education Private Limited

4. “Reinforced Concrete Structures”, Volume 1, Dr. B. C. Punmia, Ashok Kr. Jain, Arun Kr. Jain,

5. Advanced Mechanics of Solids- Srinath.L.S. : Tata McGraw Hill Publications Co.Ltd., New Delhi.

6. “Finite Element Analysis for Engineering and Technology”- Chadrupatla, Tirupathi R., University

Press, India

7. “The Finite Element Method”- Zienkeiwicz. O.C. - Tata McGraw Hill Co. Ltd., New Delhi.

8. P. Kumar Mehta – Concrete – Structure, Properties and Materials, PH, New Jersy, USA 1983.

9. A.M. Neville - “Properties of Concrete” - Longmans, 4th Edition, 1995.

10. IS 10262 “Code of Practice for Concrete Mix Design

11. Sidney, M. Johnson “Deterioration, Maintenance and Repair of Structures”.

12. R.T.Allen and S.C. Edwards, “Repair of Concrete Structures”-Blakie and Sons.

13. 12. Mechanics of Composite Materials and Structures by M. Mukhopadhya-Universities Press 2009.

14. Bhagwan D Agarvalm, and Lawrence J Brutman, “Analysis and Performance of Fiber

Composites”- John Willy and Sons.

15. Highway Engineering by Khanna and Justo

16.Principles, Practice and Design of Highway Engineering by S.K. Sharma

17.Handbook of Road Technology by M.G. Lay

18.Pavement Analysis and Design by Yang and Huang

19. The Design and Performance of Road Pavements by D. Croney and P. Croney

20. Peavy, Rowe, Techobanoglous,

Envir