

Bharati Vidyapeeth Deemed University
Faculty of Engineering and Technology
Structure of Ph. D. Coursework
(With effect from Academic Year 2017-18)

Sr. No.	Subject	Teaching Scheme		Examination Scheme (marks)			Credits
		L	P/D	Theory Examination	Presentations	Total	
1	Paper –I: Research Methodology	4	-	100	-	100	04
2	Paper- II: Advances in Civil Engineering	4	-	100	-	100	04
3	i) Literature survey presentation	-	02	--	50	50	02
	ii) Presentation of idea of research*	-	02	--	50	50	02
	Total	08	04	200	100	300	12

Note: *- The student will have to give presentation based on the literature survey and idea of research and shall submit copy of the presentation to the respective Head of the Constituent Unit which is his/her place of research.

BHARATI VIDYAPEETH DEEMED UNIVERSITY
FACULTY OF ENGINEERING AND TECHNOLOGY

Ph.D. Course-work Syllabus

Paper-I
Research Methodology

<u>TEACHING SCHEME:</u>	<u>EXAMINATION SCHEME:</u>	<u>CREDITS ALLOTTED:</u>
Lectures: 4 Hours/Week	Theory Examination: 100 Marks	Total Credits: 04
	Duration : 3Hrs	

Course Objectives:

- begin to formulate researchable problem in areas of research interest;
- write a research proposal or report;
- make appropriate choices about research strategies;
- review literature judiciously and systematically;
- understand and begin to apply the principles of collecting suitable data;
- understand and begin to conduct appropriate analyses of data;
- make appropriate choices about quantitative methods;
- demonstrate sensitivity to ethical issues raised by researchers;

Topics Covered

UNIT-I	Types and Characteristics of Research Definition and objectives of research, Characteristics of research, Types of research- Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, Overview of research methodology in various areas of engineering, Introduction to problem solving, basic research terminology such as proof, hypothesis, lemma etc., Role of information and communication technology (ICT) in research.	(6 Hours)
UNIT-II	Review of Literature Importance of literature review in defining a research problem, sources of literature, identifying the gap areas from the literature review Searching for publications: Publication databases, search engines and patent databases etc.	(6 Hours)
UNIT-III	Research Problem Formulation Research problem formulation, determine the scope, objectives, limitations and assumptions of the identified research problem, justify basis for assumption, developing the objectives Developing a research plan: Exploration, description, diagnosis and experimentation	(6 Hours)
UNIT-IV	Methods of Data Collection Static and dynamic characteristics of instruments used in experimental set up, calibration of various instruments, sampling methods, various methods of data collection, selection of appropriate method for data collection, data collection using a digital computer system, case studies of data collection.	(6 Hours)

UNIT-V	Inferential Statistics and Hypothesis Testing Data processing, data analysis strategies and tools, Basic concepts concerning testing of hypotheses, procedures of hypothesis testing, generalization and interpretation, Hypothesis testing: Z-test, T-test, Chi Square test, Analysis of variance (ANOVA) etc.	(6 Hours)
UNIT-VI	Quantitative Methods and Applied Statistics Measurement of central tendency and dispersion, Probability distribution, Regression analysis, Parameter estimation, Multivariate statistics, Principal component analysis, moments and response curve methods, probable errors in research, error analysis, Hidden Markov Model (HMM)	(6 Hours)
UNIT-VII	Computer Applications Role of computers in research, maintaining literature data using software tools such as Mendeley, Endnote2 etc., tabulation and graphical presentation of research data, use of statistical software tools such as Excel, R, SPSS, GRETL, MINITAB etc. in research, use of word processing tools such as Latex, software tools for making effective presentation.	(6 Hours)
UNIT-VIII	Developing Research Report: Structure and components of scientific reports, types of report, developing research report. Thesis Writing: Different steps and software tools in the design and preparation of thesis, layout, structure and language of typical reports, Illustrations and tables, bibliography, referencing and footnotes. Oral Presentation: Creating and making effective presentation, use of visual aids, importance of effective communication.	(6 Hours)
UNIT-IX	Research Ethics and IPR Ethics: ethical issues in research, plagiarism tools and its importance. IPR: intellectual property rights and patent law, techniques of writing a Patent, filing procedure, technology transfer, copy right, royalty, trade related aspects of intellectual property rights.	(6 Hours)
UNIT-X	Publishing of research work Design of conference and journal research paper, design of review paper, effective way of writing abstract, introduction, result and discussion and conclusion in research papers, answering the queries of reviewers. Importance of publication in standard databases such as Scopus, Web of science etc., understanding of h-index, citation index and impact factor.	(6 Hours)

Text Books/References:

1.	Wayne Goddard, Stuart Melville, Research Methodology: An Introduction, Juta and Company Ltd, 2004
2.	Ranjit Kumar, Research Methodology: A Step by Step Guide for Beginners, SAGE publications Ltd., 2011.
3.	C. R. Kothari ,Research Methodology: Methods and Trends, New Age International, 2004
4.	S.D. Sharma , Operational Research, Kedar Nath Ram Nath & Co.,1972
5.	B.L. Wadehra, Law relating to patents, trademarks, copyright designs and geographical indications, Universal Law Publishing, 2014.
6.	Donald Cooper , Pamela Schindler, Business Research Methods, McGraw-Hill publication, 2005.

7.	T. W. Anderson, An introduction to Multivariate Statistical Analysis, Wiley Eastern Pvt. Ltd. New Delhi.
8.	A. Fink, Conducting Research Literature Reviews: from the internet to paper, Sage Publications, 2009
9.	R. A. Day, How to write and publish a scientific paper, Cambridge University Press, 1992

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Ph.D. Course-work Syllabus

Paper-II: Advances in Civil Engineering

<u>TEACHING SCHEME:</u>	<u>EXAMINATION SCHEME:</u>	<u>CREDITS ALLOTTED:</u>
Lectures: 4 Hours/Week	Theory Examination: 100 Marks	Total credits: 04
	Duration : 3Hrs	

Course Objectives: To enable the research scholar

- to get the knowledge of types of flow, concepts of fluid mechanics, hydrology
- about sediment properties, effects of scour, advanced applications.
- analyse 2-D, 3-D structures.
- to know the latest concreting techniques and determination of seismic force.
- to analyse the soil stresses .
- to use various techniques of construction management.
- to get the knowledge of various treatments of water and waste water.
- to study Environment Impact analysis.
- to know the details of pavement design
- to get the knowledge of concept of transportation planning.

Topics covered

UNIT-I	FLUID MECHANICS One , two , three dimensional fluid flow equations, Gradually varied and rapidly varied flow, Hydraulic jump, Unit Hydrograph , Dimensional Analysis, Model Scales, Construction and operation of Hydraulic Models, Hydraulics of Spillways and energy dissipaters, pressure fluctuation in Hydraulic Jump	(06 Hours)
UNIT-II	HYDRAULIC ENGINEERING Properties of sediments, Modes of Sediment Transport , Sediment problems, significant sediment properties, critical tractive stress, Scour	(06 Hours)

	around bridge piers in uniform and non uniform sediments , Remote sensing and GIS applications, application of ANN	
UNIT-III	STRUCTURAL ANALYSIS Analysis of statically indeterminate beams, Finite element Method for 2-D stress Analysis, Principal Stress and Strain , Theories of failure, Torsion of open and thin walled sections,,buckling of columns.	(06 Hours)
UNIT-IV	STRUCTURAL ENGINEERING Modern Concrete and Concreting Techniques, Advanced concrete materials, composites, laminates and its applications Determination of Seismic Design forces by Static and Dynamic Method, Concept of Damping	(06 Hours)
UNIT-V	GEOTEHNICAL ENGINEERING Stress distribution under earth embankments and evaluation of settlement profile. Rankine's earth Pressure Theory , Stability of slopes by slip circle method. Stability analysis of Finite slopes	(06 Hours)
UNIT-VI	CONSTRUCTION MANAGEMENT Construction and national development, Role of government and construction agencies, Project management through CPM and PERT, Management of construction equipment for large projects, Factors affecting selection of equipment , Linear programming- simplex and two phase method.	(06 Hours)
UNIT-VII	ENVIRONMENTAL ENGINEERING Water Treatment & supply: Principles and theory of aeration, sedimentation, filtration, disinfection. Design of Sedimentation and filtration unit. Waste water treatment: Principles and theory of Screening, grit removal, primary settling, suspended and attached growth processes, anaerobic treatment. Design of Activated sludge process, trickling filter, septic tank.	(06 Hours)

UNIT-VIII	<p>ENVIRONMENTAL MANAGEMENT</p> <p>Solid waste management: Theory, composition, conveyance and treatment.</p> <p>Air Pollution: Theory and control of air pollution.</p> <p>Environment protection Act 1986.</p> <p>Environment Management Systems: ISO 14000 and its series, Environment Audit.</p> <p>GIS and GPS techniques and applications in Environmental studies.</p>	(06 Hours)
UNIT-IX	<p>HIGHWAY ENGINEERING</p> <p>Types of pavement ,Pavement design approaches, Traffic consideration in pavement design.Design of concrete pavement, Design of Flexible pavement ,IRC guidelines .</p>	(06 Hours)
UNIT-X	<p>TRANSPORTATION PLANNING</p> <p>Transport system- planning, travel demand forecasting, trip generation, Transport network, Expressways-BRT,Urban transport- Mass and rapid transits system, urban goods movement, External commodity movement, Highways- Financing-Credit financing, Private financing, BOT, BOOT, Dedicated Road funds.</p>	(06 Hours)
Text Books/References:		
1. L.R. Kadiyali, Traffic Engineering and Transportation Planning, Khanna Publishers, 2005		
2. Peavy, H.S., Rowe, D.R., Tchobanoglous, G. Environmental Engineering, McGraw Hills, New York 1985		
3. Rao C.S., Environmental pollution control Engineering, New age international Ltd, New Delhi, 1995		
4. CPHEEO, Manual on Municipal Solid waste management, Central Public Health and		

	Environmental Engineering Organization, Government of India, New Delhi, 2000.
5.	White Frank M. “Fluid Mechanics” , Tata Mc Graw Hill Publishers, New Delhi, 2008
6	Chowdary Hanif M. “Open Channel Flow”- second Edition- Springer Publications 2008
7	Garde.R.J,Ranga Raju “Mechanics of Sediment Transportation & Alluvial stream problems:.,New Age International Publishers 2000.
8	Timoshenko and Goodier, ‘Theory of Elasticity’, McGraw-Hill publications,2010
9	S.Crandall, N.Dahl and T.Lardner ‘Mechanics of Solids’ McGraw-Hill publications
10	Bowles JE, “Foundation Analysis and Design,” McGraw Hill Publications -1996
11	Das.B.M “,Advanced Soil Mechanics” ,Taylor and Francis Publications -1997
12	Metcalf and Eddy “ Waste water Treatment and Reuse: , Mcgraw Hills Newyork 2016
13	Charles H. Eccleston, Environmental Impact Assessment: A Guide to Best Professional Practices, March 29, 2017 by CRC Press
14	V. L. Shah and Dr. S. R. Karve , Limit State Theory and Design, Pune Vidyarthi Griha Publications, 1986
15	Anil K Chopra, ‘Dynamics of Structures- Theory and Applications to EarthquakeEngineering’ , Prentice-Hall publications, 2014
16	R.W.Clough and J.Penzin “ Dynamics of Structures”- McGrew-Hill publications -1993
17	S. Timoshenko and W.Krieger, “ Theory of plates and Shells”, McGrew-Hill. publications -1989
18	M.S. Shetty , “ Concrete Technology”, S. Chand, 2008
19	Hibbeler R. C., “Structural Analysis”, Prentice Hall Publication,2008
20.	Dr. Ruth Hillary Environmental Management Systems and Cleaner Production, 1997, ISBN: 978-0-471-96662-3, Wiley International
21.	S.K. Khanna C.E.G. Justo, Highway Engineering, Nem Chand and Bros, 2001

