



SANGAM UNIVERSITY

where Aspiration meets Opportunity

SANGAM UNIVERSITY

(Established by Govt. of Raj. vide Act. No.14 of 2012 and Notified by UGC u/s 2(f) of the UGC Act, 1956)
NH-79, Bhilwara Chittor By-Pass, Chittor Road, Bhilwara, PIN-311001
Rajasthan, (INDIA) Phone : +91 1482-297455

Date:- 01- September- 2014

Ph. D. Coursework Syllabus(w.e.f September 2014)

SCHEME OF EXAMINATION OF Ph.D. COURSE WORK

Paper Code	Name of the Paper	Assignment Marks / Internal	Semester Exam Marks/Viva	Total	Contact Hours	Paper Credit	Exam Duration
RES-I	Research Methodology	40	60	100	3 L+1 T	4	3 Hrs.

Total Credit for Paper 1: L (3)-T (1)-P (2): Total Credit 6

L = Lecture, T = Tutorial, P = Practical
Details syllabus of course work is given below.

PRE. PH. D. COURSEWORK SYLLABUS

Paper-I: Research Methodology

Teaching Scheme
Lectures: 04 Hrs/week

Examination Scheme
Duration: 3 Hrs
Theory: 100 Marks

Course objectives:

- To understand the role of research methodology in engineering
- To understand literature review process and formulation of a research problem
- To understand data collection methods and basic instrumentation
- To learn various statistical tools for data analysis
- To learn technical writing and communication skills required for research
- To create awareness about intellectual property rights and patents

Unit -I: Introduction to Research Method

Definition of research, Nature and scope of research, Importance of research in current scenario, 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/Management/Legal Studies/ Basic and Applied

dk *R*

Science, Introduction to problem Identification and solving, basic research terminology such as Exposition, concept, construct, types of variables , definition and types of hypothesis, proposition etc., Role of Information and Communication Technology(ICT) in research.

Unit –II: Research Problem Formulation and methods

Literature review, sources of literature, various referencing procedures, maintain literature data using Endnote2, Identifying the gap areas from the literature review and research database, Problem Formulation, Identifying variables to be studied, determine the scope, objectives, limitations and or assumptions of the identified research problem, Justify basis for assumption, Formulate time plan for achieving targeted problem solution, Important steps in research methods: Research design , types of Observation and communication , Laws and Theories, Development of Models. Developing a research plan: Exploration, Description, Diagnosis and Experimentation

Unit-III: Data collection

Static and dynamic characteristics of instruments (structured and unstructured questionnaire) used in experimental setup, calibration of various instruments, sampling methods, sample size determination, methods of data' collection, Selection of Appropriate Method for Data Collection, Data collection using a digital computer system, case studies of data collection

Unit –IV: Planning & doing Data Analysis

Editing , coding and data entry ,Data processing, data analysis strategies, and tools, data analysis with statistical packages, Basic Concepts concerning testing of hypotheses, procedures of hypothesis testing, generalization, and interpretation Applied statistics: Regression analysis, Parameter estimation, Univariate and Bivariate Multivariate statistics, Factor analysis , T test , Z test , chi square tests, Principal component analysis Software tools for modelling, Simulation, and analysis

Unit-V: Research reports and Thesis writing

Structure and components of scientific research reports, types of research report, developing a research proposal. 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, word processing tools such as Latex Oral presentation: planning, software tools, creating and making effective presentations, use of visual aids, importance of effective communication.



Unit-VI: IPR

IPR: intellectual property rights and patent law, techniques of writing a Patent, filing procedure, technology transfer, copyright, royalty, trade-related aspects of intellectual property rights

Reference/Text Books:

1. Donald R cooper Pamela Schindler, Business Research methods, 13th Edition, McGraw hill, New Delhi
2. Ranjit Kumar, Research Methodology: A Step-by-Step Guide for Beginners, SAGE publications Ltd., 2011.
3. Zikmund, W.G., Business Research methods, Cengage, latest edition
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. C. R. Kothari, Research Methodology: Methods and Trends, New Age International, 2004

