

Date: - 5<sup>th</sup> September 2016

## Ph. D. Coursework Syllabus (w.e.f. September 2016)

### 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.
RES-II	ICT Lab Work / Presentation (Practical)	40	60	100	2 P	2	1 Hr.
RES-III	Coursework related to Thesis Writing (Dissertation)	40	60	100	6 P	6	Report

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 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,



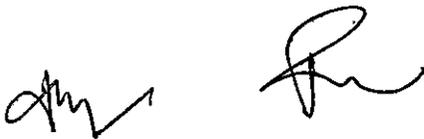
bibliography, referencing and footnotes, word processing tools such as Latex Oral presentation: planning, software tools, creating and making effective presentations, use of visual aids, importance of effective communication.

#### **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, 13<sup>th</sup> 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



## Paper-II: ICT LAB WORK

Teaching scheme  
Lectures: 02 Hrs/week

Examination Scheme  
Theory: 100 Marks  
Duration: 1 Hrs

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### Unit-I: Word Processing:

Word features, Creating, Saving and Opening Documents in Word, Interface, Toolbars, Ruler, Menus, Keyboard shortcut, Editing, Previewing, Printing and Formatting a document, Advanced Features of MS Word, Find and replace, using thesaurus, Using Auto-Multiple Functions, Mail Merge, Handling Graphics, tables and Charts, Covering a word Document into various Formats like –Text, Rich Text format, WordPerfect, HTML, PDF etc.

### Unit-II: Worksheet:

Excel: Worksheet Basics, working with single and multiple workbooks, working with formula & cell referencing, Auto sum, copying formulae, Absolute & relative addressing, Worksheet with ranges, Formatting of worksheet, Previewing and printing Worksheet, Graphs, and charts, Database, Creating and using Macros, Multiple Worksheets-concepts, creating and using, Data analysis and display.

### Unit-III: Presentation:

PowerPoint: Creating Slideshow with animations. Auto Wizard, Creating a blank presentation, auto layout, Screen layout, and views, insert a new slide, applying design template, changing slide layout, reordering and hiding slides, slideshow, and editing custom slide, resizing a textbox, Text Box Properties, Delete a text Box, Bulleted Lists, numbered lists, adding notes , video and audio, Adding text editing options, Formatting text, Replace fonts, Line spacing ,change case spelling check, colour schemes, Adding clip art, Adding an image from a file, Editing graphic, Auto Shapes, WordArt, backgrounds, Action Buttons, Slide Animation, Preview Slide transactions, Slide Show options, Slide Master, Header and Footer, Slide Numbers, Date and Time.

Educational and Research Resources on Net: Encyclopaedia, Wikipedia, On-line Tutorials, and lectures, virtual labs, Open Course-wares, Electronic Journals, E-Books, digital Libraries, and Searching research Information.

### Unit-IV: Professional Written Communication:

Students prepare E-mails, Letters, memos, proposals, formal and informal reports, work plans, and progress reports.

### Unit-V: Oral Communication:

Impromptu and Extemporaneous methods of delivery. Oral Presentations using visual aids such as handouts, overhead transparencies and presentation software such as PowerPoint.

