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)
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SANGAM UNIVERSITY
where Aspiration meets Opportunity

Date: - 1st August 2019

Ph. D. Coursework Syllabus (w.e.f. August 2019)

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
RES-IV	Research and Publication Ethics	40	60	100	2 L	2	2 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 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

Paper-II: ICT LAB WORK

Teaching scheme
Lectures: 02 Hrs/week

Examination Scheme
Theory: 100 Marks
Duration: 1 Hrs

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.

Paper-IV: RESEARCH AND PUBLICATION ETHICS

Teaching scheme:

Lectures: 02 Hrs/week

Examination Scheme

Theory: 100 Marks

Duration: 3 Hrs

OVERVIEW

- This course has a total of 6 units focusing on basics of Philosophy of science and ethics, research integrity, publication ethics. Hands on sessions are designed to identify research misconduct and predatory publications. Indexing and citation databases, open access publications, research metrics (citations, h-index, Impact Factor, etc.) and plagiarism tools will be introduced in this course.

SYLLABUS IN DETAIL
Theory

- **UNIT-1: PHILOSOPHY AND ETHICS (4hrs)**
    1. Introduction to Philosophy: definition, nature and scope, concept, branches
    2. Ethics: Definition, moral philosophy, nature of moral judgments and reactions.

- **UNIT-2: SCIENTIFIC CONDUCT (4hrs.)**
    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

- **UNIT-3: 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 behaviour and vice versa, types
    5. Violation of publication ethics, authorship and contributor ship
    6. Identification of publication misconduct, complaints and appeals
    7. Predatory publishers and journals

PRACTICE

UNIT-4: OPEN ACCESS PUBLISHING (4hrs.)

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.

UNIT-5: 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.)

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

UNIT-6: DATABASES AND RESEARCH METRICS (7 hrs.)

A. Databases (4hrs.)

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

B. Research Metrics (3hrs.)

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