Punyashlok Ahilyadevi Holkar Solapur University, Solapur
Final Year B. TECH.
Semester-VII
(Common for All Engineering Branches)

RM-01: Research Methodology and IPR

***Teaching Scheme**
Lectures: 03 Hours/week, 03 Credits
Practical : 02 Hours/week, 01Credit

***Examination Scheme**
ESE:70 Marks
ISE: 30 Marks
ICA: 25 Marks

Course Introduction: Research Methodology and Intellectual Property Rights (IPR) is a foundational course designed to develop systematic research skills and legal awareness essential for engineers, scientists, and researchers. The course introduces students to the principles, practices of scientific research, enabling them to identify research problems, review literature, formulate objectives, and hypotheses, select appropriate research methods, and analyze and interpret data effectively.

Course Objectives:
(Shall not exceed 06)
During this course, student is expected to:

1. To introduce systematic research processes and methodologies.
2. To develop skills in problem identification, literature review, and research design.
3. To familiarize students with data analysis, report writing, and ethics in research.
4. To create awareness about Intellectual Property Rights and their role in innovation.

Course Outcomes:
(Shall not exceed 06)
At the end of this course, student will be able to:

1. Understand research concepts and identify engineering research problems.
2. Conduct effective literature review and design appropriate research methodology.
3. Collect, analyze, and interpret research data.
4. Apply ethical practices and prepare technical research documents.
5. Understand various forms of Intellectual Property Rights.
6. Apply patent procedures and IPR concepts in innovation and entrepreneurship.

Section I	
Unit-1: Introduction to Research Methodology	**No. of lectures - 6**
Meaning, objectives, and types of research, Scientific research process, Engineering research and its applications, Research problem identification and formulation, Research objectives and hypotheses, Characteristics of good research	
Unit-2: Literature Review and Research Design	**No. of lectures - 7**
Purpose and sources of literature review, Review of journals, patents, standards, and databases, Identification of research gaps, Research design: exploratory, descriptive, and experimental research, Variables, sampling techniques, and sample size, Research plan and methodology selection	
Unit-3: Data Collection, Analysis, and Interpretation	**No. of lectures- 7**
Types of data: primary and secondary, Data collection methods: surveys, experiments, observations, interviews, Measurement scales, Basics of statistical analysis, Data representation: tables, graphs, and charts, Interpretation of results and validation	
Section II	
Unit-4: Research Ethics, Documentation and Publications	**No. of lectures- 6**
Research ethics and integrity, Plagiarism: types, detection, and prevention, Citation styles and reference management tools, Research paper writing: structure and format, Technical report and thesis writing, Overview of journals, conferences, impact factor, and indexing	
Unit-5: Intellectual Property Rights (IPR)	**No. of lectures- 8**
Introduction and importance of IPR, Types of IPR: Patents, Copyrights, Trademarks, Industrial Designs, Geographical Indications, National and international IPR systems. WIPO, WTO, and TRIPS agreement	
Unit-6: Patents and Technology Transfer	**No. of lectures- 6**
Patentable and non-patentable inventions, Patent search and patent databases, Procedure for patent filing in India, Patent rights, infringement, and enforcement, Technology transfer and commercialization, Role of IPR in start-ups and entrepreneurship	

Internal Continuous Assessment (ICA): **List of Experiments/Assignments/Case Studies, etc.**	
1.	Identify and formulate a research problem from a real-world engineering application with defined objectives and hypothesis.
2.	Conduct a structured literature review using Scopus/Google Scholar to identify research gaps and propose a suitable research methodology.
3.	Collect sample research data and perform basic statistical analysis.
4.	Prepare a plagiarism-free research document and plagiarism analysis report.
5.	Perform a patent search and draft a mock patent document for an innovative engineering idea.
6.	Analyze a real-world IPR or technology commercialization case highlighting legal and engineering implications.

Text Books:	
1.	C. R. Kothari, *Research Methodology: Methods and Techniques*, New Age International.
2.	Ranjit Kumar, *Research Methodology*, Pearson.
3.	S. R. Myneni, *Intellectual Property Rights*, Asia Law House.
Reference Books	
1.	WIPO, *Intellectual Property Handbook.*
2.	Indian Patent Office – Official Manuals.