Course Code	Course name	L	T	P	C
CSEG3060	Research Methodology in CS	3	0	0	3
Total Units to be Covered: 06		Total Contact Hours: 45			
Prerequisite(s):		Syllabus version: 2.0			

Course Objectives

1. To Familiarize Students with Research Problem Identification
2. To Introduce Various Research Methodologies in Computing Science
3. To Promote Ethical Conduct in Research
4. To Enhance Technical Writing and Proposal Development Skills
5. To Provide Insights into Intellectual Property and Patents

Course Outcomes

On completion of this course, the students will be able to

CO1. Identify and formulate research problems using defined criteria and characteristics.

CO2. Utilize various investigative approaches and methodologies for problem-solving in computing science research.

CO3. Demonstrate ethical conduct and awareness of research ethics and plagiarism in their work.

CO4. Produce technically sound and well-structured research reports and proposals.

CO5. Analyze and apply knowledge of intellectual property rights, particularly patents, in the context of computing science.

CO-PO Mapping

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	-	2	2	3	-	-	-	-	-	-	-	2	-	-	-
CO 2	-	2	2	3	-	-	-	-	-	-	-	2	-	-	-
CO 3	-	2	2		-	-	-	-	-	-	-	2	-	-	-
CO 4	-	-	2	-	-	-	-	3	-	2	2	2	-	-	-
CO 5	-	-	2	-	-	-	-	2	-	2	2	2	-	-	-
Average	-	1.2	2	1.2	-	-	-	1	-	.8	.8	2	-	-	-

1 – Weakly Mapped (Low) **2 – Moderately Mapped (Medium)**

3 – Strongly Mapped (High) **"_" means there is no correlation**

Syllabus

Unit I: Introduction to Research Problem **9 Lecture Hours**

Understanding Research Problem: Meaning and Significance, Sources and Identification

Criteria and Characteristics of a Good Research Problem: Essential Attributes, Errors in Selection ***Scope, Objectives, and Approaches:*** Defining Scope and Objectives, Investigative Approaches for Solutions, Data Collection, Analysis, Interpretation, Necessary Instrumentation.

Unit II: Research Methods in Computing Science **13 Lecture Hours**

Dialectic of Research in Computing Science: Models of Argument, Proof Methods (Demonstration, Empirical, Mathematical)

Deduction and Induction for Computer Science: Theoretical Models and Approaches, Algorithmic and Software Engineering Approaches, Mathematical Modelling, Performance Estimation and Evaluation

Unit III: Ethical Conduct and Literature Studies **8 Lecture Hours**

Effective Literature Studies: Approaches and Analysis, Addressing Plagiarism,

Research Ethics: Ethical Considerations in Research.

Unit IV: Technical Writing and Research Proposal Development **5Lecture Hours**

Effective Technical Writing, Report Writing Techniques, Developing a Research Proposal, Proposal Format and Components, Presentation and Review Committee Assessment.

Unit V: Intellectual Property and Patents **5 Lecture Hours**

Nature and Process of Intellectual Property: Overview of Patents, Designs, Copyrights, Patenting Process: Research, Innovation, Development

International Scenario and Patenting: International Cooperation on Intellectual Property

Procedures for Patent Grants and Patenting under PCT

Unit VI: Patent Rights and New Developments in IPR **5 Lecture Hours**

Scope and Transfer of Patent Rights: Licensing and Technology Transfer, Patent Information and Databases

New Developments in Intellectual Property Rights: Administration of Patent System, IPR in Computer Software, etc., Case Studies and IPR in Educational Institutes.

Total lecture Hours 45

Textbooks

1. "Research methodology: an introduction for science & engineering students'", Stuart Melville and Wayne Goddard
2. Research methodology for engineers by R Ganesan, MJP Publishers

Reference Books

1. Algorithm Design Manual by Steven Skiena, Springer publication.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme

Components	IA	MID SEM	End Sem	Total
Weightage (%)	50	20	30	100

Internal Assessment Component	Weightage in calculation of Internal Assessment (100 marks)

Quiz 1	15%
Quiz 2	15%
Class Test 1	15%
Class Test 2	15%
Assignment 1/Project	20%
Assignment 2/Project	20%