3.4.1 .1 Inclusion of research ethics in the research methodology course work

Research Methodology Course List

S.No	Department	Course Code	Course Name	Hrs./Week	Credit
1	M.E. Communication System	19PATM101	Research Methodology and IPR	2	2
2	M.E. Computer Science and Engineering	19PATM101	Research Methodology and IPR	2	2
3	M.E. Manufacturing Engineering	19PATM101	Research Methodology and IPR	2	2
4	M.E. Power System Engineering	19PATM101	Research Methodology and IPR	2	2
5	M.E. VLSI	19PATM101	Research Methodology and IPR	2	2

Principal

Dr. N.RAMESH BABU,
PRINCIPAL
M. Kumarasamy College of Engineering
THALAVAPALAYAM
KARUR - 639113.

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COLLEGE OF ENGINEERING
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Approved by AICTE & Affiliated to Anna University
ISO 9001:2015 Certified Institution
Thalavapalayam, Karur, Tamilnadu.

REGULATION 2019

M.E.,COMMUNICATION SYSTEMS

CURRICULUM AND SYLLABUS

CURRICULUM AND SYLLABUS

REGULATION 2019

Programme: M.E. Communication Systems

Vision of the Department:

To empower the Electronics and Communication Engineering students with emerging technologies, professionalism, innovative research and social responsibility.

Mission of the Department:

M1: Attain the academic excellence through innovative teaching learning process, research areas & laboratories and Consultancy projects**.**

M2: Inculcate the students in problem solving and lifelong learning ability.

M3: Provide entrepreneurial skills and leadership qualities**.**

M4: Render the technical knowledge and industrial skills of faculties.

Programme Educational Objectives (PEOs):

PEO1: Graduates will be capable to develop their skills and provide optimal solutions to subsystems in the areas of Communication Systems

PEO2: Graduates will be capable of carrying out scientific research in the areas of Communication Systems

PEO3: Graduates will be able to analyze societal problem and can provide technological solutions.

Programme Outcomes (POs):

PO1: An ability to independently carryout research/investigation and development work to solve practical problems

PO2: An ability to write and present a substantial report/document

PO3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program

PO4: An ability to independently carry out research to deliver solutions for complex problems in Communication systems.

PO5: Able to communicate effectively in written and oral formats.

PO6: Ability to continuously engage in life-long learning with enhanced knowledge and competence.

CURRICULUM AND SYLLABUS

REGULATION 2019

Programme: M.E. –Communication Systems

Structure of Curriculum

Sl.No.	Category	Credits
1	Basic Science courses (B)	4
2	Professional core courses (C)	12
3	Professional Elective courses relevant to chosen specialization/branch (E)	15
4	Project work, Practical, Minor project, seminar and internship in industry or elsewhere (P)	32
5	Mandatory Courses (M)	2
	Total Credits	68

*Minor variation is allowed as per need of the respective disciplines.

1. Basic Science courses (B)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PCMB101T	Applied Mathematics for Communication Engineers	3	1	0	4
				Total Credits	4

T-Lecture T-Lecture+ Tutorial L-Practical, Project, J- Lecture+ project

2. Professional Core courses (C)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PCMC101T	Advanced Communication Networks	3	0	0	3
19PCMC102T	Wireless and Mobile Communication	3	0	0	3
19PCMC103T	Antennas and Radiating Systems	3	0	0	3
19PCMC104T	Advanced Digital Signal Processing	3	0	0	3
				Total Credits	12

T-Lecture T-Lecture+ Tutorial L-Practical, Project, J- Lecture+ project

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3. Professional Elective courses relevant to chosen specialization/branch (E)

Course Code	Course Name	Hours / Week			C
		L	T	P	
Professional Elective for I-Semester					
19PCME001T	Wireless Sensor Networks	3	0	0	3
19PCME002T	Optical Networks	3	0	0	3
19PCME003T	Modern Digital Communication Techniques	3	0	0	3
19PCME004T	Cognitive Radio	3	0	0	3
19PCME005T	RF and Microwave Circuit Design	3	0	0	3
19PCME006T	DSP Architecture	3	0	0	3
19PCME007T	Communication Network Security	3	0	0	3
19PCME008T	Network Routing Algorithms	3	0	0	3
Professional Elective for II-Semester					
19PCME009T	Satellite Communication and Navigation Systems	3	0	0	3
19PCME010T	Modern Internet of Things	3	0	0	3
19PCME011T	Voice and Data networks	3	0	0	3
19PCME012T	MIMO System	3	0	0	3
19PCME013T	Programmable Networks SDN NFV	3	0	0	3
Professional Elective for III-Semester					
19PCME014T/ 19PVLE019T	Wireless Embedded Systems	3	0	0	3
19PCME015T	Remote Sensing	3	0	0	3
19PCME016T	PCB design Technology	3	0	0	3
19PCME017T	Communication Interfaces	3	0	0	3
				Total Credits	**15**

T-Lecture T-Lecture+ Tutorial L-Practical, Project, J- Lecture+ project

4. Project work, minor project, seminar and internship in industry or elsewhere (P)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PCMP101L	Communication systems Lab I	0	0	4	2
19PCMP102L	Communication systems Lab II	0	0	4	2
19PCMP103L	Minor Project I	0	0	4	2
19PCMP104L	Project work Phase I	0	0	20	10
19PCMP105L	Project work Phase II	0	0	32	16
				Total Credits	**32**

T-Lecture T-Lecture+ Tutorial L-Practical, Project, J- Lecture+ project

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5. Mandatory Courses (M)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PATM101	Research Methodology and IPR	2	0	0	2
19PATM102	English for Research Paper Writing	1	0	0	0
19PATM103	Pedagogy Studies	1	0	0	0
				Total Credits	**2**

T-Lecture T-Lecture+ Tutorial L-Practical, Project, J- Lecture+ project

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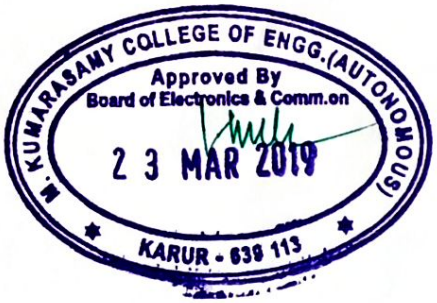
SEMESTER I						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	19PCMB101T	Applied Mathematics for Communication Engineers	3	1	0	4
C	19PCMC101T	Advanced Communication Networks	3	0	0	3
C	19PCMC102T	Wireless and Mobile Communication	3	0	0	3
E		Professional Elective I	3	0	0	3
E		Professional Elective II	3	0	0	3
P	19PCMP101L	Communication Systems Lab I	0	0	4	2
M	19PATM101	Research Methodology and IPR	2	0	0	2
M	19PATM102	English for Research Paper Writing	1	0	0	0
					Total Credits	20

SEMESTER II						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	19PCMC103T	Antennas and Radiating Systems	3	0	0	3
C	19PCMC104T	Advanced Digital Signal Processing	3	0	0	3
E		Professional Elective III	3	0	0	3
E		Professional Elective IV	3	0	0	3
P	19PCMP102L	Communication systems Lab II	0	0	4	2
P	19PCMP103L	Minor Project I	0	0	4	2
M	19PATM103	Pedagogy Studies	1	0	0	0
					Total Credits	16



SEMESTER III						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
E		Professional Elective V	3	0	0	3
E		Professional Elective VI	3	0	0	3
P	19PCMP104L	Project Work Phase I	0	0	20	10
					Total Credits	16

SEMESTER IV						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
P	19PCMP105L	Project Work Phase II	0	0	32	16
					Total Credits	16

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Category / Semester	I	II	III	IV	Category wise Total Credits
Basic Science Course(B)	4	-	-	-	4
Professional Core(C)	6	6	-	-	12
Professional Elective(E)	6	6	6	-	18
Practical / Lab (P)	2	2	-	-	4
Project Work(P)	-	2	10	16	28
Mandatory Course(M)	2	-	-	-	2
Semester Wise Total Credits	**20**	**16**	**16**	**16**	**68**

Regulation 2019		Semester I	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	19PATM101	**Research Methodology and IPR**	2	0	0	2

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

1	Understand and analyse the fundamental of research problem
2	Understand the Research Ethics
3	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity
4	Understand Intellectual Property Rights
5	Understand Patents Rights

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Understand research problem formulation
CO2	Analyze research related information
CO3	Follow research ethics
CO4	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular
CO5	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits

UNIT I	INTRODUCTION	6

Meaning of research problem- Sources of research problem-Criteria Characteristics of a good research problem- Errors in selecting a research problem- Scope and objectives of research problem.

UNIT II	ANALYSIS OF REARCH	6

Approaches of investigation of solutions for research problem- data collection- analysis-interpretation- Necessary instrumentations Effective literature studies approaches- analysis Plagiarism,- Research ethics.

UNIT III	RESEACRH PRPOSAL AND TECHNICAL WRITING	6

Effective technical writing - how to write report-Paper Developing a Research Proposal- Format of research proposal- a presentation and assessment by a review committee.

UNIT IV	INTELLECTUAL PROPERTY	6

Nature of Intellectual Property: Patents –Designs - Trade and Copyright- Process of Patenting and

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Development: technological research- innovation- patenting- And development. International Scenario: International cooperation on Intellectual Property- Procedure for grants of patents- Patenting under PCT.		
UNIT V	**PATENTS RIGHTS**	**6**
Patent Rights: Scope of Patent Rights- Licensing and transfer of technology -Patent information and databases- Geographical Indications.		

Text Book (s)	
1	Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students".
2	Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007
Reference (s)	
1	Ranjit Kumar, 2 nd Edition , "Research Methodology: A Step by Step Guide for beginners"
2	T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008
3	Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.
4	Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"

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M.E. – COMPUTER SCIENCE AND ENGINEERING

REGULATION 2019

CURRICULUM AND SYLLABUS

CURRICULUM AND SYLLABUS

REGULATION 2019

Programme: M.E. – Computer Science and Engineering

Vision of the Department:

- To achieve education and research excellence in computer Science and Engineering

Mission of the Department:

M1: To excel in academic through effective teaching learning techniques.

M2: To promote research in the area of computer science and engineering with the focus on innovation.

M3: To transform students into technically competent professionals with societal and ethical responsibilities.

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Programme Educational Objectives (PEOs):

- **PEO 1: To empower graduates to identify, create and solve computing problems by applying their knowledge of computing principles and mathematical theory to develop sustainable solutions to current and future computing problems.**
- **PEO 2: To develop research attitude in graduates and to exploit it for higher education endeavors and constantly upgrade their skills with an attitude towards lifelong learning.**
- **PEO 3: To facilitate graduates to acquire skills to communicate effectively with the society and contribute to the betterment of the society as a committed technical personnel.**

Programme Specific Outcomes (PSOs):

- **PSO 1: Attain the ability to design and develop computer applications and provide innovative solutions.**
- **PSO 2: The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future.**

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STRUCTURE OF CURRICULUM

Sl.No.	Category	Credits
1	Professional core courses (C)	11
2	Basic Science courses (B)	04
3	Professional Elective courses relevant to chosen specialization/branch (E)	20
4	Project work, Minor project**, seminar and internship in industry or elsewhere (P)	28
5	Mandatory Courses (M)	02
	Total Credits	65

1. Professional core courses (C)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PCSC101J	Advanced Data Structures	3	0	2	4
19PCSC102J	Advanced Algorithms	3	0	2	4
19PCSC103T	Soft Computing	3	0	0	3
				Total Credits	11

L-Lecture T-Tutorial P-Practical

2. Basic Science courses (B)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PCSB101T	Mathematical foundations of Computer Science	3	1	0	4
				Total Credits	04

L-Lecture T-Tutorial P-Practical

3. Program Elective courses relevant to chosen specialization/branch (E) (Any 6 Subjects)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PCSE001J	Machine Learning Techniques	3	0	2	4
19PCSE002J	Web Engineering	3	0	2	4
19PCSE003J	Agile Software Development and Usability Engineering	3	0	2	4
19PCSE004J	IoT Architecture and Programming	3	0	2	4
19PCSE005J	Cloud Services and Virtualization	3	0	2	4
19PCSE006J	Data Science and Analytics	3	0	2	4
19PCSE007J	Image Processing and Analysis	3	0	2	4
19PCSE008T	Distributed Systems	3	0	0	3

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19PCSE009T	Human and Computer Interaction	3	0	0	3
19PCSE010T	GPU Computing	3	0	0	3
19PCSE011T	Advanced Wireless Sensor Networks	3	0	0	3
19PCSE012T	Security for IoT	3	0	0	3
19PCSE013T	Software Project Management	3	0	0	3
19PCSE014T	Mobile Application Development	3	0	0	3
19PCSE015T	Software Quality Assurance	3	0	0	3
19PCSE016T	Block Chain Technology	3	0	0	3
19PCSE017T	Cyber Security and Computer Forensics	3	0	0	3
19PCSE018T	Recommender System	3	0	0	3
19PCSE019T	Modern Computer Architecture	3	0	0	3
19PCSE020T	Advanced Database	3	0	0	3
19PCSE021T	Optimization Techniques	3	0	0	3
19PCSE022T	Compiler for High Performance Computing	3	0	0	3
19PCSE023T	Social Network Analysis	3	0	0	3
19PCSE024T	Computer Vision	3	0	0	3
19PCSE025T	Information Retrieval Techniques	3	0	0	3
				Total Credits	20

L-Lecture T-Tutorial P-Practical

4. Project work, minor project, seminar and internship in industry or elsewhere (P)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PCSP101L	Mini Project with Seminar	2	0	0	2
19PCSP102L	Project Phase I	0	0	20	10
19PCSP103L	Project Phase II	0	0	32	16
				Total Credits	28

L-Lecture T-Tutorial P-Practical

5. Mandatory Courses (M)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PATM101	Research Methodology and IPR	2	0	0	2
19PATM102	English for Research Paper Writing	1	0	0	Nil
19PATM103	Pedagogy Studies	1	0	0	Nil
				Total Credits	2

L-Lecture T-Tutorial P-Practical

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I to IV Semester Curriculum

Semester I						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	19PCSB101T	Mathematical foundations of Computer Science	3	1	0	4
C	19PCSC101J	Advanced Data Structures	3	0	2	4
E	*********J	Program Elective I	3	0	2	4
E	*********T	Program Elective II	3	0	0	3
M	19PATM101	Research Methodology and IPR	2	0	0	2
M	19PATM102	English for Research Paper Writing	1	0	0	0
					Total Credits	17

L-Lecture T-Tutorial P-Practical

Semester II						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	19PCSC102J	Advanced Algorithms	3	0	2	4
C	19PCSC103T	Soft Computing	3	0	0	3
E	*********J	Program Elective III	3	0	2	4
E	*********T	Program Elective IV	3	0	0	3
M	19PATM103	Pedagogy Studies	1	0	0	0
P	19PCSP101L	Mini Project with Seminar	2	0	0	2
					Total Credits	16

L-Lecture T-Tutorial P-Practical

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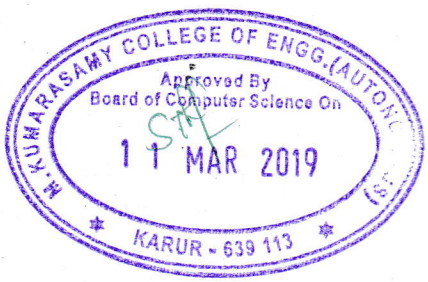
Semester III						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
E	*********T	Program Elective V	3	0	0	3
E	*********T	Program Elective VI	3	0	0	3
P	19PCSP102L	Project Phase I	0	0	20	10
					Total Credits	16

L-Lecture T-Tutorial P-Practical

Semester IV						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
P	19PCSP103L	Project Phase II	0	0	32	16
					Total Credits	16

Total Credits: 65*



Regulation 2019		Semester I	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	19PATM101	**Research Methodology and IPR**	2	0	0	2

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

1	Understand and analyse the fundamental of research problem
2	Understand the Research Ethics
3	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity
4	Understand Intellectual Property Rights
5	Understand Patents Rights

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Understand research problem formulation
CO2	Analyze research related information
CO3	Follow research ethics
CO4	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular
CO5	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits

UNIT I	INTRODUCTION	6

Meaning of research problem- Sources of research problem-Criteria Characteristics of a good research problem- Errors in selecting a research problem- Scope and objectives of research problem.

UNIT II	ANALYSIS OF REARCH	6

Approaches of investigation of solutions for research problem- data collection- analysis-interpretation- Necessary instrumentations Effective literature studies approaches- analysis Plagiarism,- Research ethics.

UNIT III	RESEACRH PRPOSAL AND TECHNICAL WRITING	6

Effective technical writing - how to write report-Paper Developing a Research Proposal- Format of research proposal- a presentation and assessment by a review committee.

UNIT IV	INTELLECTUAL PROPERTY	6

Nature of Intellectual Property: Patents –Designs - Trade and Copyright- Process of Patenting and

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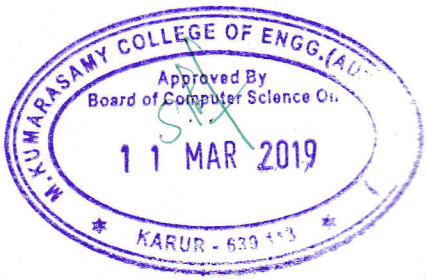
Development: technological research- innovation- patenting- And development. International Scenario: International cooperation on Intellectual Property- Procedure for grants of patents- Patenting under PCT.		
UNIT V	**PATENTS RIGHTS**	**6**
Patent Rights: Scope of Patent Rights- Licensing and transfer of technology -Patent information and databases- Geographical Indications.		
Text Book (s)		
1	Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students".	
2	Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007	
Reference (s)		
1	Ranjit Kumar, 2 nd Edition , "Research Methodology: A Step by Step Guide for beginners"	
2	T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008	
3	Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.	
4	Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"	



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Department of Mechanical Engineering

REGULATIONS 2019

M.E. MANUFACTURING ENGINEERING

I TO IV SEMESTERS (FULL TIME) CURRICULUM AND SYLLABUS

SEMESTER I

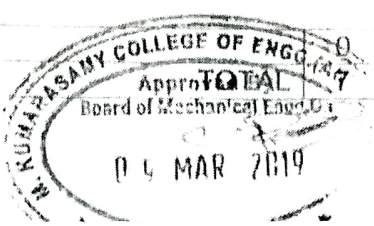
S. No	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	19PMAB101T	Applied Probability and Statistics	3	1	0	4
2	19PMEC101T	Advanced Materials Technology	3	0	0	3
3	19PMEC102T	Automated Computer Integrated Manufacturing Systems	3	0	0	3
4	19PMEC103T	Modern Manufacturing Processes	3	0	0	3
5	19PMEC104T	Robot Design and Programming	3	0	0	3
6	E1	Elective I	3	0	0	3
7	19PATM101	Research Methodology and IPR	2	0	0	2
PRACTICAL						
8	19PMEC105L	CAD/CAM Laboratory	0	0	4	2
		TOTAL	20	1	4	23

SEMESTER II

S. No	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	19PMEC106T	Optimization Techniques in Manufacturing	3	0	0	3
2	19PMEC107T	Manufacturing Metrology and Quality Engineering	3	0	0	3
3	19PMEC108T	Theory of Metal Forming	3	0	0	3
4	19PMEC109T	Material Testing and Characterization Techniques	3	0	0	3
5	E2	Elective II	3	0	0	3
6	E3	Elective III	3	0	0	3
7	19PATM102	English for Research Paper Writing	1	0	0	0
PRACTICAL						
8	19PMEC110L	Automation and Metal Forming Laboratory	0	0	4	2
		TOTAL	19	0	4	20

SEMESTER III

S. No	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1	E4	Elective IV	3	0	0	3
2	E5	Elective V	3	0	0	3
3	19PATM103	Pedagogy Studies	1	0	0	0
PRACTICAL						
4	19PMEP201L	Project Work (Phase I)	0	0	12	6
		TOTAL	7	0	12	12



SEMESTER IV

S. No	COURSE CODE	COURSE TITLE	L	T	P	C
1	19PMEP202L	Project Work (Phase II)	0	0	24	12
		TOTAL	**0**	**0**	**24**	**12**

TOTAL CREDITS TO BE EARNED FOR THE AWARD OF THE DEGREE = 67

LIST OF ELECTIVES FOR M.E. MANUFACTURING ENGINEERING

SEMESTER I (Elective I)

S. NO	COURSE CODE	COURSE TITLE	L	T	P	C
1.	19PMEE001T	Fluid Power Automation	3	0	0	3
2.	19PMEE002T	Design for Manufacture and Assembly	3	0	0	3
3.	19PMEE003T	Advances in Casting and Welding	3	0	0	3
4.	19PMEE004T	Metal Cutting Theory and Practice	3	0	0	3
5.	19PMEE005T	Manufacturing of Automotive Parts	3	0	0	3

SEMESTER II (Elective II & III)

S. NO	COURSE CODE	COURSE TITLE	L	T	P	C
1.	19PMEE006T	Finite Element Methods for Manufacturing Engineering	3	0	0	3
2.	19PMEE007T	Materials Management	3	0	0	3
3.	19PMEE008T	Industrial Ergonomics	3	0	0	3
4.	19PMEE009T	Polymers and Composite Materials	3	0	0	3
5.	19PMEE010T	Non-Destructive Evaluation	3	0	0	3
6.	19PMEE011T	Lean Manufacturing	3	0	0	3
7.	19PMEE012T	Quality and Reliability Engineering	3	0	0	3
8.	19PMEE013T	MEMS and Nanotechnology	3	0	0	3
9.	19PMEE014T	Surface Engineering	3	0	0	3

SEMESTER III (Elective IV & V)

S. NO	COURSE CODE	COURSE TITLE	L	T	P	C
1.	19PMEE015T	Micro Manufacturing	3	0	0	3
2.	19PMEE016T	Computer Aided Product Design	3	0	0	3
3.	19PMEE017T	Financial Management	3	0	0	3
4.	19PMEE018T	Manufacturing Management	3	0	0	3
5.	19PMEE019T	Concepts of Green Manufacturing	3	0	0	3
6.	19PMEE020T	Nanotechnology	3	0	0	3
7.	19PMEE021T	Mechatronics	3	0	0	3
8.	19PMEE022T	Manufacturing Techniques	3	0	0	3
9.	19PMEE023T	Production and Operation Management	3	0	0	3

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Board of Mechanical Engg.Co
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Regulation 2019		Semester I	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	19PATM101	Research Methodology and IPR	2	0	0	2

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

1	Understand and analyse the fundamental of research problem
2	Understand the Research Ethics
3	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity
4	Understand Intellectual Property Rights
5	Understand Patents Rights

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Understand research problem formulation
CO2	Analyze research related information
CO3	Follow research ethics
CO4	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular
CO5	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits

UNIT I	INTRODUCTION	6

Meaning of research problem- Sources of research problem-Criteria Characteristics of a good research problem- Errors in selecting a research problem- Scope and objectives of research problem.

UNIT II	ANALYSIS OF REARCH	6

Approaches of investigation of solutions for research problem- data collection- analysis- interpretation- Necessary instrumentations Effective literature studies approaches- analysis Plagiarism,- Research ethics.

UNIT III	RESEACRH PRPOSAL AND TECHNICAL WRITING	6

Effective technical writing - how to write report-Paper Developing a Research Proposal- Format of research proposal- a presentation and assessment by a review committee.

UNIT IV	INTELLECTUAL PROPERTY	6

Nature of Intellectual Property: Patents Designs - Trade and Copyright- Process of Patenting and

Development: technological research- innovation- patenting- And development. International Scenario: International cooperation on Intellectual Property- Procedure for grants of patents- Patenting under PCT.		
UNIT V	**PATENTS RIGHTS**	**6**
Patent Rights: Scope of Patent Rights- Licensing and transfer of technology -Patent information and databases- Geographical Indications.		

Text Book (s)	
1	Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students".
2	Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007
Reference (s)	
1	Ranjit Kumar, 2 nd Edition , "Research Methodology: A Step by Step Guide for beginners"
2	T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008
3	Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.
4	Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"

M.KUMARASAMY COLLEGE OF ENGINEERING

(An Autonomous Institution and Affiliated to Anna University Chennai)

KARUR – 639 113

PG

CURRICULUM AND SYLLABUS
M.E. POWER SYSTEMS ENGINEERING

REGULATION 2019

CURRICULUM AND SYLLABUS

REGULATION 2019

Programme: M.E. – POWER SYSTEMS ENGINEERING

Vision of the Department:

To produce smart and dynamic professionals with profound theoretical and practical knowledge comparable with the best in the field.

Mission of the Department:

M1: Produce hi-tech professionals in the field of Electrical and Electronics Engineering by inculcating core knowledge.

M2: Produce highly competent professionals with thrust on research.

M3: Provide personalized training to the students for enriching their skills.

Programme Educational Objectives (PEO's)

PEO1: Graduates of theprogramme will have excellent career in power sectors and its related disciplines.

PEO2: Graduates of the programme will have technical competency in solving challenging societal tasks in ethical and economical manner.

PEO3: Graduates of the programme will reveal lifelong learning and team work in their chosen profession.

Programme Outcomes (POs)

PO1: Students have an ability to independently carry out research /investigation and development work to solve practical problems

PO2: Students have an ability to write and present a substantial technical report/document

PO3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.

PO4:Students have an ability to analyse problems related to Power Systems and be able to synthesise the domain knowledge and incorporate the principles in the state of art systems for further enrichment

PO5:Students should be able to critically investigate the prevailing complex Power System scenarios and arrive at possible solutions independently, by applying the acquired theoretical and practical knowledge

PO6:Students should be able to identify optimal solutions for improvising power transfer capability, enhancing power quality and reliability.

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Structure of Curriculum

Sl.No.	Category	Credits
1	Basic Science courses (B)	04
2	Professional core courses (C)	23
3	Professional Elective courses relevant to chosen specialization/branch (E)	18
4	Project work, Minor project, seminar and internship in industry or elsewhere (P)	22
5	Mandatory Courses (M)	02
	Total Credits	69*

*Minor variation is allowed as per need of the respective disciplines.

1. Basic Science courses (B)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PPSB101T	Applied Mathematics for Electrical Engineers	3	1	0	4
				Total Credits	04

L-Lecture T-Tutorial P-Practical

2. Professional core courses (C)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PPSC101T	Advanced Power System Analysis	3	1	0	4
19PPSC102T	Advanced Power System Operation and Control	3	0	0	3
19PPSC103T	System Theory	3	0	0	3
19PPSC104L	Power System Simulation Laboratory	0	0	3	2
19PPSC105T	Power System Dynamics	3	0	0	3
19PPSC106T	Power Electronics Application to Power Systems	3	0	0	3
19PPSC107T	Restructured Power Systems	3	0	0	3
19PPSC108L	Power Electronics Application to Power Systems Laboratory	0	0	3	2
				Total Credits	**23**

L-Lecture T-Tutorial P-Practical

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3. Professional Elective courses relevant to chosen specialization/branch (E) (Any 6 Subjects)

Course Code	Course Name	Hours / Week			C
		L	T	P	
SEMESTER I – Elective I					
19PPSE001T	Modeling and Analysis of Electrical Machines	3	0	0	3
19PPSE002T	Power Converters for Renewable Energy Sources	3	0	0	3
19PPSE003T	Power System Planning and Reliability	3	0	0	3
SEMESTER II - Elective II & III					
19PPSE004T	Power System Economics	3	0	0	3
19PPSE005T	Control System Design	3	0	0	3
19PPSE006T	EHVAC Transmission	3	0	0	3
19PPSE007T	Electrical Transients in Power Systems	3	0	0	3
19PPSE008T	Energy Management and Auditing	3	0	0	3
19PPSE009T	Power Distribution Systems	3	0	0	3
SEMESTER III - Elective IV, V & VI					
19PPSE010T	Advanced Power System Dynamics	3	0	0	3
19PPSE011T	Smart Grid	3	0	0	3
19PPSE012T	High Voltage Direct Current Transmission	3	0	0	3
19PPSE013T	Industrial Power System Analysis and Design	3	0	0	3
19PPSE014T	Optimal Control and Filtering	3	0	0	3
19PPSE015T	Solar and Energy Storage Systems	3	0	0	3
19PPSE016T	Optimization Techniques	3	0	0	3
19PPSE017T	Power System Stability	3	0	0	3
19PPSE018T	Wind Energy Conversion Systems	3	0	0	3
19PPSE019T	Power System Protection	3	0	0	3
				Total Credits	18*

L-Lecture T-Tutorial P-Practical

4. Project work, minor project, seminar and internship in industry or elsewhere (P)

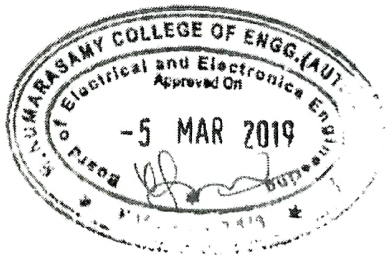
Course Code	Course Name	Hours / Week			C
		L	T	P	
19PPSP101L	Mini Project	0	0	4	2
19PPSP102L	Project Work (Phase –I)	0	0	12	6
19PPSP103L	Project work (Phase –II)	0	0	28	14
				Total Credits	22

L-Lecture T-Tutorial P-Practical

5. Mandatory Courses (M)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PATM101	Research Methodology and IPR	2	0	0	2
19PATM102	English for Research Paper Writing	1	0	0	0
19PATM103	Pedagogy Studies	1	0	0	0
				Total Credits	2

L-Lecture T-Tutorial P-Practical



I to IV Semester Curriculum

Semester I						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	19PPSB101T	Applied Mathematics for Electrical Engineers	3	1	0	4
C	19PPSC101T	Advanced Power System Analysis	3	1	0	4
C	19PPSC102T	Advanced Power System Operation and Control	3	0	0	3
C	19PPSC103T	System Theory	3	0	0	3
E	19PPSEXXXT	Elective I	3	0	0	3
C	19PPSC104L	Power System Simulation Laboratory	0	0	3	2
M	19PATM101	Research Methodology and IPR	2	0	0	2
M	19PATM102	English for Research Paper Writing	1	0	0	0
					Total Credits	21

Semester II						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	19PPSC105T	Power System Dynamics	3	0	0	3
C	19PPSC106T	Power Electronics Application to Power Systems	3	0	0	3
C	19PPSC107T	Restructured Power Systems	3	0	0	3
E	19PPSEXXXT	Elective II	3	0	0	3
E	19PPSEXXXT	Elective III	3	0	0	3
C	19PPSC108L	Power Electronics Application to Power Systems Laboratory	0	0	3	2
P	19PPSP101L	Mini Project	0	0	4	2
M	19PATM103	Pedagogy Studies	1	0	0	0
					Total Credits	19

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Semester III						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
E	19PPSEXXXT	Elective IV	3	0	0	3
E	19PPSEXXXT	Elective V	3	0	0	3
E	19PPSEXXXT	Elective VI	3	0	0	3
P	19PPSP102L	Project Work (Phase –I)	0	0	12	6
					Total Credits	15

Semester IV						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
P	19PPSP103L	Project work (Phase –II)	0	0	28	14
					Total Credits	14

L-Lecture T-Tutorial P-Practical

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TOTAL CREDITS = 69

Regulation 2019		Semester I	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	19PATM101	Research Methodology and IPR	2	0	0	2

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

1	Understand and analyse the fundamental of research problem
2	Understand the Research Ethics
3	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity
4	Understand Intellectual Property Rights
5	Understand Patents Rights

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Understand research problem formulation
CO2	Analyze research related information
CO3	Follow research ethics
CO4	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular
CO5	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits

UNIT I	INTRODUCTION	6

Meaning of research problem- Sources of research problem-Criteria Characteristics of a good research problem- Errors in selecting a research problem- Scope and objectives of research problem.

UNIT II	ANALYSIS OF REARCH	6

Approaches of investigation of solutions for research problem- data collection- analysis-interpretation- Necessary instrumentations Effective literature studies approaches- analysis Plagiarism,- Research ethics.

UNIT III	RESEACRH PRPOSAL AND TECHNICAL WRITING	6

Effective technical writing - how to write report-Paper Developing a Research Proposal- Format of research proposal- a presentation and assessment by a review committee.

UNIT IV	INTELLECTUAL PROPERTY	6

Nature of Intellectual Property: Patents –Designs - Trade and Copyright- Process of Patenting and

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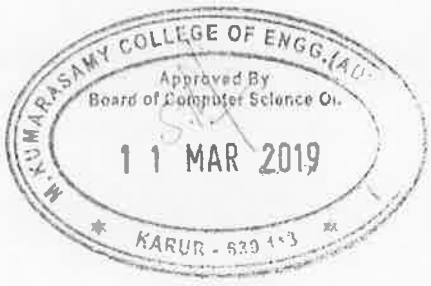
11 MAR 2019
KARUR - 639 113

Development: technological research- innovation- patenting- And development. International Scenario: International cooperation on Intellectual Property- Procedure for grants of patents- Patenting under PCT.		
UNIT V	PATENTS RIGHTS	6
Patent Rights: Scope of Patent Rights- Licensing and transfer of technology -Patent information and databases- Geographical Indications.		

Text Book (s)	
1	Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students".
2	Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007
Reference (s)	
1	Ranjit Kumar, 2 nd Edition , "Research Methodology: A Step by Step Guide for beginners"
2	T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008
3	Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.
4	Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"



CURRICULUM AND SYLLABUS

REGULATION 2019

Programme: M.E. – VLSI Design

Structure of Curriculum

Sl.No.	Category	Credits
1	Basic Science courses (B)	4
2	Professional core courses (C)	12
3	Professional Elective courses relevant to chosen specialization/branch (E)	15
4	Open Electives –Electives from other technical and /or emerging subjects (O)	3
5	Project work, Practical Minor project, seminar and internship in industry or elsewhere (P)	32
6	Mandatory Courses (M)	2
	Total Credits	68

*Minor variation is allowed as per need of the respective disciplines.

1. Basic Science courses (B)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PVLB101T	Applied Mathematics for Electronics Engineers	3	1	0	4
				Total Credits	**4**

T-Lecture, T-Lecture+ Tutorial, L-Practical,Project, J- Lecture+ Project

2. Professional core courses (C)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PVLC101T	Analog and Digital CMOS VLSI Design	3	0	0	3
19PVLC102T	Advanced Digital System Design	3	0	0	3
19PVLC103T	Low Power VLSI Design	3	0	0	3
19PVLC104T	VLSI Design Verification and Testing	3	0	0	3
				Total Credits	**12***

T-Lecture, T-Lecture+ Tutorial, L-Practical, Project, J- Lecture+ Project

3. Professional Elective courses relevant to chosen specialization/branch (E) (Any 5 Subjects)

Course Code	Course Name	Hours / Week			C
		L	T	P	
Professional Elective for I-Semester					
19PVLE001T	Solid State Devices	3	0	0	3
19PVLE002T	VLSI Signal Processing	3	0	0	3
19PVLE003T	Analog Integrated Circuit Design	3	0	0	3
19PVLE004T	CMOS Circuit Design –Layout and Simulation	3	0	0	3
19PVLE005T	CAD for VLSI	3	0	0	3
19PVLE006T	ASIC Design	3	0	0	3
19PVLE007T	RTL Simulation and Synthesis with PLDs	3	0	0	3
19PVLE008T	CAD of Digital System	3	0	0	3
Professional Elective for II-Semester					
19PVLE009T	Testing of VLSI Circuits	3	0	0	3
19PVLE010T	SoC Design	3	0	0	3
19PVLE011T	Memory Technologies	3	0	0	3
19PVLE012T	Introduction to MEMS System Design	3	0	0	3
19PVLE013T	Mixed Signal IC Design	3	0	0	3
19PVLE014T	Network Security and Cryptography	3	0	0	3
19PVLE015T	Communication Buses and Interfaces	3	0	0	3
Professional Elective for III-Semester					
19PVLE016T	Communication Network-I	3	0	0	3
19PVLE017T	Selected Topics in Mathematics	3	0	0	3
19PVLE018T	Nano Materials and Nanotechnology	3	0	0	3
19PVLE019T/ 19 PCME014T	Wireless Embedded Systems	3	0	0	3
				Total Credits	15*

T-Lecture, T-Lecture+ Tutorial, L-Practical, Project, J- Lecture+ Project

4. Open subjects –Electives from other technical and /or emerging subjects (O) (Any 1 Subjects)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PVLO001T	Business Analytics	3	0	0	3
19PVLO002T	Industrial Safety	3	0	0	3
19PVLO003T	Composite Materials	3	0	0	3
19PVLO004T	Waste to Energy	3	0	0	3
19PVLO005T	Operations Research	3	0	0	3
19PVLO006T	Cost Management of Engineering Projects	3	0	0	3
				Total Credits	15*

T-Lecture, T-Lecture+ Tutorial, L-Practical, Project, J- Lecture+ Project

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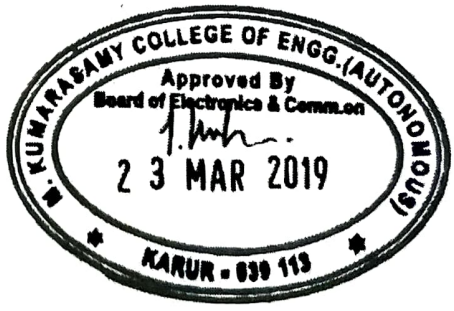
5. Mandatory Courses (M)

Course Code	Course Name	Hours / Week			C
		L	T	P	
19PATM101	Research Methodology and IPR	2	0	0	2
19PATM102	English for Research Paper Writing	1	0	0	0
19PATM103	Pedagogy Studies	1	0	0	0
				Total Credits	2

T-Lecture T-Lecture+ Tutorial L-Practical, Project, J- Lecture+ project

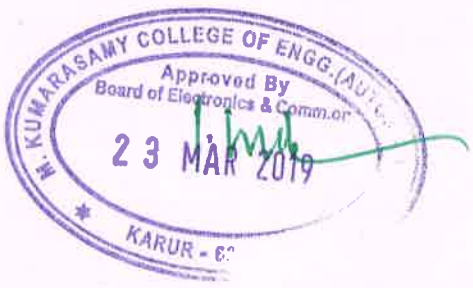


SEMESTER I						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	19PVLB101T	Applied Mathematics for Electronics Engineers	3	1	0	4
C	19PVLC101T	Analog and Digital CMOS VLSI Design	3	0	0	3
C	19PVLC102T	Advanced Digital System design	3	0	0	3
E		Professional Elective I	3	0	0	3
E		Professional Elective II	3	0	0	3
P	19PVLP101L	VLSI Design Lab I	0	0	4	2
M	19PATM101	Research Methodology and IPR	2	0	0	2
M	19PATM102	English for Research Paper Writing	1	0	0	0
					Total Credits	20

SEMESTER II						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	19PVLC103T	Low power VLSI Design	3	0	0	3
C	19PVLC104T	VLSI Design Verification and Testing	3	0	0	3
E		Professional Elective III	3	0	0	3
E		Professional Elective IV	3	0	0	3
P	19PVLP102L	VLSI Design Lab II	0	0	4	2
P	19PVLP103L	Minor Project – I	0	0	4	2
M	19PATM103	Pedagogy Studies	1	0	0	0
					Total Credits	16

SEMESTER III						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
E		Professional Elective V	3	0	0	3
O		Open Elective- I	3	0	0	3
P	19PVLP104L	Project work Phase –I	0	0	20	10
					Total Credits	16

SEMESTER IV						
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
P	19PVLP105L	Project work Phase –II	0	0	32	16
					Total Credits	16



Category / Semester	I	II	III	IV	Category wise Total Credits
Basic Science courses (B)	4	-	-	-	4
Professional Core (C)	6	6	-	-	12
Professional Elective (E)	6	6	3	-	15
Open Elective (O)	-	-	3	-	3
Lab(L)	2	2	-	-	4
Project Work(P)	-	2	10	16	28
Mandatory Course(M)	2	-	-	-	2
Semester Wise Total Credits	**20**	**16**	**16**	**16**	**68**

Regulation 2019		Semester I	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	19PATM101	Research Methodology and IPR	2	0	0	2

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

1	Understand and analyse the fundamental of research problem
2	Understand the Research Ethics
3	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity
4	Understand Intellectual Property Rights
5	Understand Patents Rights

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Understand research problem formulation
CO2	Analyze research related information
CO3	Follow research ethics
CO4	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular
CO5	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits

UNIT I	INTRODUCTION	6

Meaning of research problem- Sources of research problem-Criteria Characteristics of a good research problem- Errors in selecting a research problem- Scope and objectives of research problem.

UNIT II	ANALYSIS OF REARCH	6

Approaches of investigation of solutions for research problem- data collection- analysis-interpretation- Necessary instrumentations Effective literature studies approaches- analysis Plagiarism,- Research ethics.

UNIT III	RESEACRH PRPOSAL AND TECHNICAL WRITING	6

Effective technical writing - how to write report-Paper Developing a Research Proposal- Format of research proposal- a presentation and assessment by a review committee.

UNIT IV	INTELLECTUAL PROPERTY	6

Nature of Intellectual Property: Patents –Designs - Trade and Copyright- Process of Patenting and

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11 MAR 2019

Development: technological research- innovation- patenting- And development. International Scenario: International cooperation on Intellectual Property- Procedure for grants of patents- Patenting under PCT.		
UNIT V	**PATENTS RIGHTS**	**6**
Patent Rights: Scope of Patent Rights- Licensing and transfer of technology -Patent information and databases- Geographical Indications.		
Text Book (s)		
1	Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students".	
2	Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007	
Reference (s)		
1	Ranjit Kumar, 2 nd Edition , "Research Methodology: A Step by Step Guide for beginners"	
2	T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008	
3	Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.	
4	Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"	