PRAGATI ENGINEERING COLLEGE: SURAMPALEM
(Autonomous)
ELECTRICAL AND ELECTRONICS ENGINEERING

III Year II semester

Research Methodology

Course Category	Humanities including Management	**Course Code**	20HM6T10
Course Type	Theory	**Lecture-Tutorial-Practice**	2 -0 -0
Prerequisites		**Internal Assessment** **Semester End Examination** **Total Marks**	 100

Course Outcomes		**Blooms Taxonomy Level**
On successful completion of the course, the student will be able to		
CO 1	understand some basic concepts of research and its methodologies and develop the basic framework of research process	Understanding
CO 2	Identify research problem and identify various sources of information for literature review	Analyzing
CO 3	Understand the concept of Research Design and develop a proper research plan	Understanding
CO 4	Identify various sources of information for Data collection and Understand and apply statistical techniques for better decision making	applying
CO 5	Formulate Research Report and Research proposal to solve a particular problem.	Evaluating

Contribution of Course Outcomes towards achievement of Program

Outcomes: 1 – Low, 2 - Medium, 3 – High

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**
CO1	0	0	0	0	0	2	0	2	0	1	0	2
CO2	0	0	0	0	0	1	0	2	1	1	0	1
CO3	0	0	0	0	0	1	0	1	1	1	0	0
CO4	0	0	0	0	0	1	0	1	1	1	0	0
CO5	0	0	0	0	0	1	1	1	1	1	0	2

Course Content :

Unit – I

Introduction: Nature and Importance of Research, Aims of social research, Types of Research, Research Approaches, Ethical issues in Research, Research Methods verses Methodology, Criteria of Good Research, Steps in Research process.

Unit –II

Defining the Research Problem and Literature survey: Definition of Research Problem, Problem Formulation, Necessity of Defining the Problem, Technique involved in Defining a Problem,

Importance of Literature Survey, Sources of Information, Assessment of Quality of Journals and Articles, Information through Internet.

Unit –III

Research Design: Meaning of Research Design, Need of Research Design, Important concepts related to Design, Different Research Designs Selection of an appropriate survey Research Design, The nature of field work and Field work management Self-administered Questionnaires , Developing a Research Plan

Unit – IV

Data collection and statistical Inference: Collection of Primary Data, Secondary Data, Methods of Data Collection, Need For Sampling, Sampling Design, Formulation of Hypothesis –Tests of Hypothesis - Introduction to Null hypothesis vs. Alternative Hypothesis, Parametric vs. Non-Parametric Tests, Procedure for testing of Hypothesis, Tests of significance for Small Samples, Application, t-test, Chi Square test

Unit – V

Research Report Writing and Research Proposal: Format of the Research report, References/Bibliography, Technical paper writing, Journal Report Writing, Making Presentation, Writing a Research Proposal and Research Report, Writing Research Grant Proposal.

Reference Books

1. C.R Kothari, Research Methodology, Methods & Technique; New Age International Publishers
2. R. Ganesan, Research Methodology for Engineers, MJP Publishers.
3. Ratan Khananabis and Suvasis Saha, Research Methodology, Universities Press, Hyderabad.
4. Y. P. Agarwal, Statistical Methods: Concepts, Application and Computation, Sterling Publs., Pvt., Ltd., New Delhi.
5. Vijay Upagade and Aravind Shende, Research Methodology, S. Chand & Company Ltd., New Delhi.
6. G. Nageswara Rao, Research Methodology and Quantitative methods, BS Publications, Hyderabad.
7. Naval Bajjai “Business Research Methods” Pearson .

Web Resources

https://www.indeed.com/career-advice/career-development/research-design

https://online.hbs.edu/blog/post/data-collection-methods

https://imotions.com/blog/statistical-tools/

III Year II Semester

S No	Category	Course Title	Course Code	Hours per week			Credits
				L	T	P	
1	PCC	Microprocessor and Microcontrollers	20EC6T21	3	1	0	3
2	PCC	VLSI Design	20EC6T22	3	0	0	3
3	PCC	Digital Signal Processing	20EC6T23	3	0	0	3
4	PEC	**Professional Elective courses - 2**					
		Microwave Engineering	20EC6T27	3	0	0	3
		Mobile & Cellular Communication	20EC6T28	3	0	0	3
		CMOS Analog IC Design	20EC6T29	3	0	0	3
5	OEC	**Open Elective courses 2**					
		Disaster Management	20CE6T35	3	0	0	3
		Fundamentals of Electric Vehicles	20EE6T19	3	0	0	3
		Introduction to Automobile Engineering	20ME6T25	3	0	0	3
		Computer Forensics	20CS6T15	3	0	0	3
6	ECC	Microprocessor and Microcontrollers - Lab	20EC6L08	0	0	3	1.5
7	ECC	VLSI Design Lab	20EC6L09	0	0	3	1.5
8	ECC	Digital Signal Processing Lab	20EC6L10	0	0	3	1.5
9	SOC	Arm/Aurdino based Programming	20EC6S03	1	0	2	2
10	MC	Research Methodology	20HM6T10	2	0	0	0
			Total credits				**21.5**
Industrial/Research Internship (Mandatory) 2 Months during summer vacation							

Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)	**4**	**0**	**0**	**4**

III YEAR – II SEMESTER

S. No.	Category	Course Code	Course Title	L	T	P	C
1	PCC	20ME6T19	Design of Machine Members-II	3	0	0	3
2	PCC	20ME6T20	Heat Transfer	3	0	0	3
3	PCC	20AM6T03	Introduction to Artificial Intelligence and Machine Learning	3	0	0	3
4	**Professional Elective-II**						
	PEC	20ME6T21	Operations Research	3	0	0	3
	PEC	20ME6T22	Automobile Engineering	3	0	0	3
	PEC	20ME6T23	Industrial Robotics	3	0	0	3
	PEC	20ME6T24	Statistical Quality Control	3	0	0	3
	PEC	20ME6O02	MOOCs(NPTEL/SWAYAM) course (12 week Duration)	3	0	0	3
5	**Open Elective-II**						
	OEC	20CE6T40	Disaster Management	3	0	0	3
	OEC	20EE6T19	Fundamentals of Electric Vehicles	3	0	0	3
	OEC	20EC6T26	Sensors and Transducers	3	0	0	3
	OEC	20CS6T15	Computer Forensics	3	0	0	3
6	PCC	20ME6L12	Heat Transfer Laboratory	0	0	3	1.5
7	PCC	20ME6L13	Metrology and Instrumentation Laboratory	0	0	3	1.5
8	PCC	20ME6L14	CAE and CAM Laboratory	0	0	3	1.5
9	SOC	20AM6S02	Artificial Intelligence and Machine Learning Laboratory	1	0	2	2
10	MC	20HM6T10	Research Methodology	2	0	0	0
Total Credits							**21.5**
Industrial/Research Internship (Mandatory) 2 Months during summer vacation							

Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)	**4**	**0**	**0**	**4**

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III **YearIISemester**

Sl.No.	Dept	CourseCode	CourseTitle	L	T	P	Credits
1	PCC	20EC6T24	MicroprocessorsandMicrocontrollers	3	0	0	3
2	PCC	20EE6T14	ElectricalMeasurementsand Instrumentation	3	0	0	3
3	PCC	20EE6T15	Power SystemAnalysis	3	0	0	3
ProfessionalElective –II							
4	PEC	20EC6T25	SignalandSystems	3	0	0	3
		20EE6T16	ElectricDrives				
		20EE6T17	AdvancedControlSystems				
		20EE6T18	PowerSystemOperationandControl				
OpenElective–II/JobOrientedElective-II							
5	OEC	20CE6T35	DisasterManagement	3	0	0	3
		20ME6T25	IntroductiontoAutomobileEngineering				
		20EC6T26	SensorsandTransducers				
		20CS6T15	Computer Forensics				
6	PCC	20EE6L10	ElectricalMeasurementsand InstrumentationLaboratory	0	0	3	1.5
7	PCC	20EC6L08	MicroprocessorsandMicrocontrollers Laboratory	0	0	3	1.5
8	PCC	20EE6L11	PowerSystemsandSimulationLaboratory	0	0	3	1.5
9	SOC	20AM6S03	SkillAdvancedCourse:Machine LearningwithPython-I	1	0	2	2
10	MC	20HM6T10	ResearchMethodology	2	0	0	0
TotalCredits				**21.5**			
MinorsCourse*/Honors Course*				4	0	0	4
Industrial/ ResearchInternship2 Months(Mandatory)afterthirdyear(tobeevaluatedduringVII Semester)							