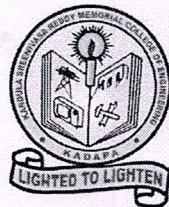


Regulations for PG Programs in Engineering (R22PG)
(Effective from 2022-23)

Department of Civil Engineering

M. Tech (R22PG) Syllabus

Geotechnical Engineering



Kandula Srinivasa Reddy Memorial College of Engineering
(Autonomous)

Kadapa-516005. AP

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**Annexure – 1 Curriculum
Geotechnical Engineering (Civil Engineering)**

1st Semester

S. No.	Course Codes	Course Name	Category	L	T	P	IM	EM	Credits
1	2212101	Advanced Soil Mechanics	PCC	3	0	0	40	60	3
2	2212102	Advanced Foundation Engineering	PCC	3	0	0	40	60	3
3	Program Elective Course – I		PEC	3	0	0	40	60	3
	2212103	Soil Structure Interaction							
	2212104	Ground Improvement Techniques							
	2212105	Geoenvironmental Engineering							
4	Program Elective Course – II		PEC	3	0	0	40	60	3
	2212106	Critical Soil Mechanics							
	2212107	FEM in Geotechnical Engineering							
	2212108	Pavement Analysis and Design							
5	2212109	Soil Mechanics – 1 Lab	PCC	0	0	4	50	50	2
6	2212110	Soil Mechanics – 2 Lab	PCC	0	0	4	50	50	2
7	2212111	Research Methodology & IPR	-	2	0	0	40	60	2
8	Audit Course – I		Audit	2	0	0	40	0	0
	2270A01	English for Research Paper Writing							
	2270A02	Disaster Management							
	2270A03	Sanskrit for Technical Knowledge							
				16	0	8	340	400	18

2nd Semester

S. No.	Course Codes	Course Name	Category	L	T	P	IM	EM	Credits
1	2212201	Experimental Geomechanics	PCC	3	0	0	40	60	3
2	2212202	Earth Retaining Structures	PCC	3	0	0	40	60	3
3	Program Elective Course – III		PEC	3	0	0	40	60	3
	2212203	Dynamics of Soil and Foundations							
	2212204	Foundations on Expansive Soils							
	2212205	Offshore Geotechnical Engineering							
4	Program Elective Course – IV		PEC	3	0	0	40	60	3
	2212206	Design of Under Ground Excavations							
	2212207	Design with Geosynthetics							
	2212208	Geotechnical Earthquake Engineering							
5	2212209	Subsoil Exploration Lab	PCC	0	0	4	50	50	2
6	2212210	Geotechnical Engineering Modeling Lab	PCC	0	0	4	50	50	2
7	2212211	Technical Seminar	-	0	0	4	100	0	2
8	Audit Course – II		Audit	2	0	0	40	0	0
	2270A04	Value Education							
	2270A05	Constitution of India							
	2270A06	Pedagogy Studies							
				14	0	12	400	340	18

M. Tech., I Semester

Course Title	Research Methodology & IPR					M. Tech, 1 Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
2212111	Mandatory Course (MC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	40	60	100
Mid Exam Duration: 2 Hrs.						End Exam Duration: 3 Hrs.		
<p>Course Objectives: The course is designed to students,</p> <ul style="list-style-type: none"> • About the basics of how research problems are defined, research methods are adopted and/or developed, research is undertaken, and how research results are communicated to the peers. 								
On successful completion of this course, the students will be able to								
CO 1	Understand research problem formulation.							
CO 2	Analyze research related information, follow research ethics							
CO 3	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.							
CO 4	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.							
CO 5	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

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. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

UNIT-II

Literature

Effective literature studies approaches, analysis Plagiarism, Research ethics.

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UNIT-III

Technical Writing

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

Nature of Intellectual Property

Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

UNIT-V

Patent Rights and New Developments in IPR

Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications. Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

Textbooks:

1. Stuart Melville and Wayne Goddard, "Research methodology: An Introduction for Science & Engineering Students", Juta Education, 1996.
2. Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners", Sage Publications, 2011.

Reference Books:

1. Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", Clause 8 Publishing, 2021.
2. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

V. S. S. Murthy

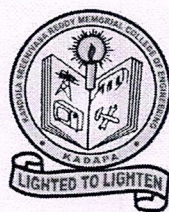
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Regulations for PG Programs in Engineering (R22PG)
(Effective from 2022-23)

Department of Electrical and Electronics Engineering

M. Tech (R22PG) Syllabus

Power Systems



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M. Tech. Power Systems (PS)**Course Structure and Syllabus for the 2022-23 Batch****I-Semester**

S. No.	Subject Code	SUBJECT	SC	L	T	P	IM	EM	CR
1	2252101	Advanced Power System Protection	PCC	3	0	0	40	60	3
2	2252102	Power System Dynamics - I	PCC	3	0	0	40	60	3
		Professional Elective Course – I (PEC - I)							
3	2252103	Energy Conversion Systems	PEC	3	0	0	40	60	3
	2252104	Smart grid Technologies	PEC	3	0	0	40	60	3
	2252105	Wind and Solar Energy Systems	PEC	3	0	0	40	60	3
		Professional Elective Course – II (PEC - II)							
4	2252106	Electrical Power Distribution System	PEC	3	0	0	40	60	3
	2252107	Mathematical Methods in Power Engineering	PEC	3	0	0	40	60	3
	2252108	Electric and Hybrid Vehicles	PEC	3	0	0	40	60	3
5	2252109	Research Methodology and IPR	--	2	0	0	40	60	2
6	2252110	Power System Lab - I	PCC	0	0	4	50	50	2
7	2252111	Power System Simulation Lab-I	PCC	0	0	4	50	50	2
8	---	Audit Course I	AC	2	0	0	40	00	00
Total				16	00	08	340	400	18

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Course Title	Research Methodology and IPR					M. Tech., I Semester		
Course Code	Category	Hours / Week			Credits	Maximum Marks		
2252109	--	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	0	0	3	40	60	100
Mid Exam Duration: 2Hrs					End Exam Duration : 3Hrs			
<p>Course Objectives: The objective of the course is to learn a perspective on research to the scholars so as to broaden their conceptions of what research involves and to impart knowledge on techniques related to research such as problem formulation, literature survey, information retrieval, use of statistical techniques, writing of research reports and evaluation To expose the scholars ethics in research and Intellectual Property Rights.</p>								
<p>On successful completion of this course, the students will be able to</p>								
CO 1	Understand research problem formulation and research ethics							
CO 2	Analyze research related information							
CO 3	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.							
CO 4	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.							
CO 5	Understand that IPR protection provides an incentive to inventors for further research work							

UNIT - I

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.

Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations.

UNIT - II

Effective literature studies approaches, Plagiarism and Research ethics

UNIT - III

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

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UNIT - IV

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

UNIT - V

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

Text Books:

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students".
2. Wayne Goddard and Stuart Melville, "Research Methodology: an Introduction".
3. Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners".

Reference Books:

1. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd, 2007.
2. Mayall, "Industrial Design", McGraw Hill, 1992.
3. Niebel, "Product Design", McGraw Hill, 1974.
4. Asimov, "Introduction to Design", Prentice Hall, 1962.
5. Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", 2016.
6. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008.

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Regulations for PG Programs in Engineering (R22PG)
(Effective from 2022-23)

Department of Mechanical Engineering

M. Tech (R22PG) Syllabus

Renewable Energy



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Department of Mechanical Engineering
RENEWABLE ENERGY

1st Semester

S. No.	Course codes	CourseName	Category	Hours per Week			IM	EM	Credits
				L	T	P			
1	2299101	Advanced Thermodynamics and Fluid Mechanics	PC	3	0	0	40	60	3
2	2299102	Introduction to Renewable Energy systems	PC	3	0	0	40	60	3
3	Program Elective Course-I		PE	3	0	0	40	60	3
	2299103	Hydrogen and Fuel Cell Technologies							
	2299104	Wind Energy Technology							
	2299105	Process Modeling and Simulation in Renewable Energy Systems							
4	Program Elective Course-II		PE	3	0	0	40	60	3
	2299106	Energy Storage Technology							
	2299107	Energy Conservation by Waste Heat Recovery							
	2299108	Developing Energy Efficiency and Renewable Energy Projects							
5	2299109	Fuels lab	PC	0	0	4	50	50	2
6	2299110	Solar lab	PC	0	0	4	50	50	2
7	2299111	Research Methodology & IPR	MC	2	0	0	40	60	2
8	Audit Course-I		AC	2	0	0			
	2270A05	Disaster Management							
		Constitution of India							
		Stress Management by Yoga							
				16	0	8			18

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Page 2

Course no.	Subject	L-T-P	Credit
2299111	Research Methodology & IPR	2-0-0	2

a. Course Objectives

- To familiarize with modeling, referencing, literature survey, etc
- To design experiments and to analyze results of the experiments
- To prepare technical reports and research papers
- To prepare material for technical presentation and do oral presentation
- To understand the purpose and terms of IPR
- To orient to ethics in research and publication

b. Course Outcomes

At the end of this course, students will be able to

- Co1: Understand research problem formulation.
- Co2: Analyze research related information
- Co3: Follow research ethics
- Co4: Analyze that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
- Co5: Analyze 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.

c. Course contents

UNIT I

Meaning of Research, Types of Research, Research Process, Problem definition, Objectives of Research, Research Questions, Research design, Approaches to Research, Quantitative vs. Qualitative Approach, Understanding Theory, Building and Validating Theoretical Models, Exploratory vs. Confirmatory Research, Experimental vs Theoretical Research, Importance of reasoning in research.

UNIT II

Problem Formulation, Understanding Modeling & Simulation, Conducting Literature Review, Referencing, Information Sources, Information Retrieval, Role of libraries in Information Retrieval, Tools for identifying literatures, Indexing and abstracting services, Citation indexes.

UNIT III

Experimental Research: Cause effect relationship, Development of Hypothesis, Measurement Systems Analysis, Error Propagation, Validity of experiments, Statistical Design of Experiments, Field Experiments, Data/Variable Types & Classification, Data collection, Numerical and Graphical Data Analysis: Sampling, Observation, Surveys, Inferential Statistics, and Interpretation of Results

UNIT IV

Preparation of Dissertation and Research Papers, Tables and illustrations, Guidelines for writing the abstract, introduction, methodology, results and discussion, conclusion sections of a manuscript. References, Citation and listing system of documents.

UNIT V

Intellectual property rights (IPR)-patents-copyrights-Trademarks-Industrial design geographical indication. Ethics of Research-Scientific Misconduct-Forms of Scientific Misconduct. Plagiarism, Unscientific practices in thesis work, Ethics in science

d. Suggested texts books:

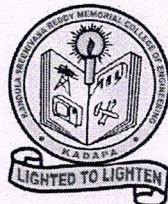
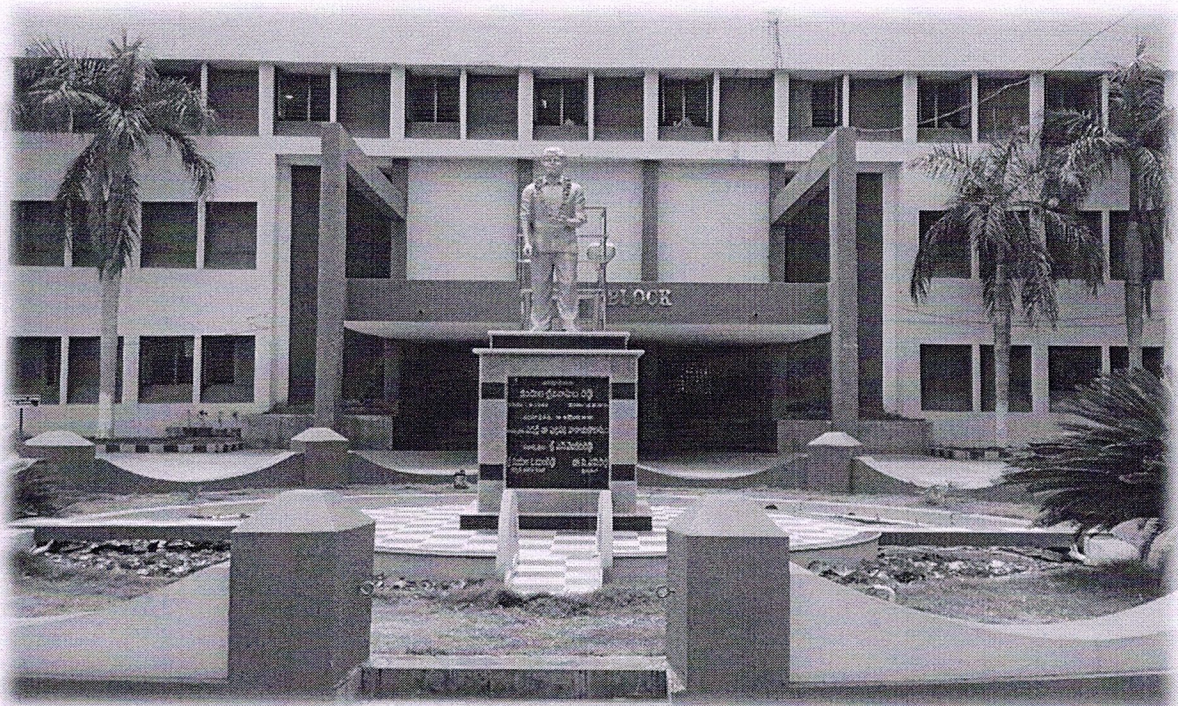
1. Borden, K. S. and Abbott, B. B., "Research Design and Methods—A Process Approach", 8th Edition, McGraw-Hill, 2021
2. C. R. Kothari, "Research Methodology—Methods and Techniques", 2nd Edition, New Age International Publishers

Reference :

1. Davis, M., Davis K., and Dunagan M., "Scientific Papers and Presentations", 3rd Edition, Elsevier Inc.
2. Michael P. Marder, "Research Methods for Science", Cambridge University Press, 2019
3. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2018
3. Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age". Aspen Law & Business; 6th Edition July 2022

Regulations for PG Programs in Engineering (R22PG)
(Effective from 2022-23)

Department of Electronics and Communication Engineering
M. Tech (R22PG) Syllabus
Embedded Systems & VLSI



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Department of ECE
M.Tech Embedded Systems and VLSI Course Structure

Semester-I									
S.No	Course Code	Course Name	Category	L	T	P	IM	EM	Credits
1.	2284101	RTL Simulation and Synthesis With PLDs	PCC	3	0	0	40	60	3
2.	2284102	Microcontrollers and Programmable Digital Signal Processors	PCC	3	0	0	40	60	3
3.	2284103	Research methodology and IPR	-	2	0	0	40	60	2
Professional Elective Course-I									
4.	2284104	Parallel Processing	PEC	3	0	0	40	60	3
	2284105	Digital Signal and Image Processing							
	2284106	VLSI Signal Processing							
	2284107	Design for testability							
Professional Elective Course-II									
5.	2284108	Programming Languages for Embedded Systems	PEC	3	0	0	40	60	3
	2284109	Micro-Electro Mechanical systems.							
	2284110	CAD of Digital System							
	2284111	CPLD, FPGA Architectures and Applications.							
6.	2284112	RTL Simulation and Synthesis with PLDs Lab	PCC	0	0	4	50	50	2
7.	2284113	Microcontrollers and Programmable Digital Signal Processors Lab	PCC	0	0	4	50	50	2
8.	2270A02	Disaster Management	AC				40		0
									18

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Course Title	RESEARCH METHODOLOGY AND IPR				M. Tech ES & VLSI I Sem			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
2284103	PCC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		2	0	--	2	40	60	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs			
Course Objectives: <ul style="list-style-type: none"> ➤ To understand research problem formulation. ➤ To Analyze research related information ➤ To Follow research ethics ➤ To 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. ➤ To 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. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Understand research problem formulation.							
CO 2	Analyze research related information							
CO 3	Follow research ethics							
CO 4	Apply Patent Rights in filing.							
CO 5	Describe new developments in IPR.							

UNIT I

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting are search problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, Analysis, interpretation, Necessary instrumentations.

UNIT II

Effective literature studies approaches, Analysis Plagiarism and Research ethics. 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 III

Nature of Intellectual Property: Patents, Designs, Trade and Copyright, Process of Patenting and Development: Technological research, Innovation, Patenting, Development. International Scenario: International Cooperation on Intellectual Property, Procedure for grants of patents, Patent in gender PCT.

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UNIT IV

Patent Rights: Scope of Patent Rights, Licensing and transfer of technology, Patent information and databases, Geographical Indications.

UNIT V

New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

TEXT BOOKS:

1. Stuart Melville and Wayne Goddard, "Research Methodology: An Introduction for Science & Engineering students"
2. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
3. Ranjit Kumar, "Research Methodology: A Step by Step Guide for beginners" , 2nd Edition ,

REFERENCE BOOKS:

1. Mayall, "Industrial Design", Mc Graw Hill, 1992.
2. Niebel, "Product Design", Mc Graw Hill, 1974.
3. Asimov, "Introduction to Design", Prentice Hall, 1962.
4. Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", 2016.
5. T. Ramappa, "Intellectual Property Rights Under WTO", S.Chand, 2008

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Regulations for PG Programs in Engineering (R22PG)
(Effective from 2022-23)

Department of Computer Science and Engineering

M. Tech (R22PG) Syllabus

Artificial Intelligence and Data Science



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K.S.R.M. COLLEGE OF ENGINEERING
KADAPA-516005, (A.P.)

ARTIFICIAL INTELLIGENCE & DATA SCIENCE

M.Tech - Artificial Intelligence & Data Science (Computer Science & Engineering)

Semester - I

S. No.	Course codes	Course Name	Category	Hours per week			IM	EM	Credits
				L	T	P			
1.	2298101	Machine Learning	PCC	3	0	0	40	60	3
2.	2298102	Artificial Intelligence	PCC	3	0	0	40	60	3
3.	2298103 2298104 2298105	Program Elective Course – I 1. Big Data Analytics 2. Information retrieval 3. Natural Language Processing	PEC	3	0	0	40	60	3
4.	2298106 2298107 2298108	Program Elective Course - II 1. Data Visualization Techniques 2. Distributed Systems 3. Medical Image Processing	PEC	3	0	0	40	60	3
5.	2298109	AI & ML Lab	PCC	0	0	4	50	50	2
6.	2298110	Advanced Python Programming Lab	PCC	0	0	4	50	50	2
7.	2284103	Research Methodology & IPR	MC	2	0	0	40	60	2
8.	2270AXX	Audit Course – I	AC	2	0	0	40	0	0
Total							340	400	18

Semester - II

S. No.	Course codes	Course Name	Category	Hours per			IM	EM	Credits
				L	T	P			
1.	2298201	Data Science	PCC	3	0	0	40	60	3
2.	2298202	Deep Learning	PCC	3	0	0	40	60	3
3.	2298203 2298204 2298205	Program Elective Course - III 1. Block Chain Technology 2. Exploratory Data Analysis using R 3. Video Analytics	PEC	3	0	0	40	60	3
4.	2298206 2298207 2298208	Program Elective Course – IV 1. Text Mining & Time Series Data Analysis 2. Social Media Analysis 3. Artificial Intelligence in Cyber Security	PEC	3	0	0	40	60	3
5.	2298209	Deep Learning Lab	PCC	0	0	4	50	50	2
6.	2298210	Program Elective Course Lab	PEC	0	0	4	50	50	2
7.	2298211	Technical seminar	PROJ	0	0	4	100	0	2

Course Title	Research Methodology & IPR				M.Tech AI&DS I Sem			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
2284103	MC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		2	0	0	2	40	60	100
Mid Exam Duration: 2 Hours					End Exam Duration: 3Hrs			
Course Objectives:								
<ul style="list-style-type: none"> Understand research technology. Be aware of the technical principles of research, ethical challenges and approval processes. Describe quantitative, qualitative and mixed methods approaches to research Identifying the components of a literature review process. 								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Understand research problem formulation							
CO 2	Analyze research related information							
CO 3	Follow research ethics							
CO 4	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity							
CO 5	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.							
CO 6	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

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. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

UNIT II

Effective literature studies approaches, analysis Plagiarism, Research ethics.

UNIT III

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

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

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PRINCIPAL

UNIT V

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications. New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs

Text Books:

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students".
2. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction".
3. Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners".
4. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007.
5. Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", 2016.

Reference Books:

1. Mayall , "Industrial Design", McGraw Hill, 1992.
2. Niebel , "Product Design", McGraw Hill, 1974.
3. Asimov , "Introduction to Design", Prentice Hall, 1962.
4. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008.

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