R-16

CURRICULUM ESSENTIALS

Handbook on Outcome Based Education

ELECTRONICS AND INSTRUMENTATION ENGINEERING

NARULA INSTITUTE OF TECHNOLOGY

WWW.NIT.AC.IN

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Institute Vision

To make the Institute excellent in technological education and research by imparting equitable, inclusive, ethical, flexible and multidisciplinary knowledge to budding technologists to serve the society.

Institute Mission

- To establish continuously improving academic ambience in the Institute in order to prepare the students with beyond curriculum knowledge, creativity, innovation, problem solving abilities, teamwork, communication skills etc. for their holistic development.
- To collaborate with Institutes of higher education, Professional Societies, R&D and Industrial organisations for continuous improvement of academic, research environment in the Institute and to build a strong Industry-Institute interface.
- To promote and nurture entrepreneurial and innovative quality of the students providing proper education, training and supportive facilities so that future entrepreneurs emerge with flying colors.
- To strengthen quality and knowledge-base of faculty through faculty development programmes for continuous up gradation to remain in tune with dynamically changing technology.
- To become a responsible contributor in the socio-economic development of the society through excellence in education and research.

Institute Quality Policy

- Adoption of appropriate standards and practices for good governance, to bring in transparency of all operations and thereby improve credibility at all levels.
- Industry-ready professionals to be developed through interactive teaching learning process involving state of the art class rooms, laboratories, libraries, corporate exposure and innovative project work.
- Higher studies/research for faculty & staff to be encouraged for up gradation of knowledge through participation in Quality Improvement Programs, Seminars, Workshops, Webinars etc.
- Laboratory facilities would be upgraded in emerging areas to promote R&D activities including participation in Govt. and Industry funded projects.
- Industrial consultancy to be carried out in an effective manner for developing sense of accomplishment.
- Interaction with Professional Societies would be encouraged for the professional growth and development of the students, faculties and staff for mutual benefit.
- NBA Accreditation for all AICTE approved programs to be obtained at the earliest and maintained on a long-term basis.
- The innovative and entrepreneurial skills of the students to be nurtured through Innovation & Incubation centre, finally culminating in start-ups.

Department Vision

To uniquely position the Graduate as a Leader in Innovation and Excellence in Instrumentation, Control, Measurements and to recognise professional framework reflecting social Responsibility.

Department Mission

The Mission of the Department is to develop the next generation of Engineers in the Instrumentation sector by teaching them problem solving, leadership and teamwork skills, and the value of a commitment quality, ethical behaviour, and respect for others. To create and disseminate knowledge through research and to transfer our intellectual to enhance society in meaningful and sustainable ways.

Program Educational Objectives (PEOs)

B.Tech. in Electronics and Instrumentation Engineering

The main objectives of the EIE Department are:

PEO1. To provide students with a strong foundation in Mathematical, Scientific and Engineering fundamentals.

PEO2. To acquaint students with necessary knowledge to formulate, solve and analyse engineering problems related to industry and research.

PEO3. To impart the state of the art technology to the students in the field of Electronics and Instrumentation Engineering.

PEO4. To foster the innovation, invention and entrepreneurship by enabling the students to transform their ideas to proof- of-concepts for high-tech applications.

PEO5. To inculcate in the students professional and ethical attitude, communication skills and the life-long learning skills needed for the successful professional career.

PEO6. To provide opportunity for the students to work as part of teams on multi-disciplinary projects.

PEO7. Work in core Instrumentation and allied industries and software companies and / or become successful entrepreneurs.

PEO8. Pursue their higher studies at the institutes of repute in India and abroad and work in educational institutions, research organizations and engineering consultancy companies.

PEO9. Have the highest integrity, social responsibility, teamwork skills and leadership capabilities in their profession or career.

Program Specific Outcomes (PSOs)

B.Tech. in Electronics and Instrumentation Engineering

PSO1. Professional Skills: An ability to understand the basic concepts in Electronics and Instrumentation engineering and to apply them to various areas like electronics, sensors, transducer, industrial instrumentation, biomedical engineering etc., in the design and implementation of complex systems.

PSO2. Problem-solving skills: An ability to solve complex Electronics and Instrumentation engineering problems, using latest hardware and software tools along with analytical skills to arrive cost effective and appropriate solutions.

PSO3. Successful Career and Entrepreneurship: An understanding of social-awareness & environmental-wisdom along with ethical responsibility to have a successful career and to sustain passion and zeal for real-world applications using optimal resources as an entrepreneur.

Program outcomes (POs)

Engineering Graduates will be able to:

PO1. Apply knowledge of mathematics, science, engineering fundamentals and an instrumentation engineering specialization to arrive solution for complex engineering problems.

PO2. Identify, formulate and analyze complex engineering problems using first principles of mathematics, management and engineering.

PO3. Design solutions for instrumentation engineering problems and develop Instrumentation and related system components or processes that meet specified needs with appropriate consideration for public health, safety, cultural, societal and environmental issues.

PO4. Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

PO5. Create, select and apply appropriate state-of-the-art techniques, resources and modern engineering and computing tools with an understanding of the limitations.

PO6. Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.

PO7. Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

PO8. Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

PO9. Function effectively as an individual, and as a member or leader in multidisciplinary teams.

PO10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO11. Recognize the need for and have the preparation and ability to engage in independent and life- long learning in the broadest context of technological change.

PO12. Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Curriculum Structure

DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

B.Tech First Semester Curriculum

A. THEORY							
Sl. No.	**Paper Code**	**Course Name**	**Contact Hours/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	M 101	Mathematics – I	3	1	0	4	4
2	CH 101 / PH 101	Chemistry – I (Gr. A) / Physics – I (Gr. B)	3	1	0	4	4
3	EE 101 / EC 101	Basic Electrical Engineering (Gr. A) / Basic Electronics Engineering (Gr. B)	3	1	0	4	4
4	HU 101	Communicative English	2	0	0	2	2
5	ME 101	Engineering Mechanics	3	1	0	4	4
Total of Theory						**18**	**18**

B. PRACTICAL							
Sl. No.	**Paper Code**	**Course Name**	**L**	**T**	**P**	**Total**	**Credit Points**
6	HU 191	Language Laboratory and Seminar Presentation	0	0	2	2	1
7	CH 191 / PH 191	Chemistry – I Laboratory (Gr. A) / Physics – I Laboratory (Gr. B)	0	0	3	3	2
8	EE 191 / EC 191	Basic Electrical Engineering Laboratory (Gr. A) / Basic Electronics Engineering Laboratory (Gr. B)	0	0	3	3	2
9	ME 191 / ME 192	Engineering Drawing and Graphics (Gr. A) / Workshop Practice (Gr. B)	0	0	3	3	2
Total of Practical						**11**	**7**

C. SESSIONAL							
10	XC 181	Extra-Curricular Activity (NSS / NCC)	0	0	2	2	**1**
Total of Theory, Practical & Mandatory Activities / Courses						**31**	**26**

Paper Name: Basic Electrical Engineering
Paper Code: EE 101

COs	Statement
EE 101.1	To understand and analyze basic electric and magnetic circuits.
EE 101.2	To understand and analyze basic electric and magnetic circuits.
EE 101.3	Understand and analysis transient and steady-state response of any electrical circuit/network by applying different circuit analysis methods. To understand and analyze basic electric and magnetic circuits.

Paper Name: Chemistry – I
Paper Code: CH101

COs	Statement
CH 101.1	Describe and apply fundamental concepts of the chemical thermodynamics to engineering applications
CH 101.2	Ability to analyze & design different energy storage devices
CH 101.3	Determine, analyze and interpret the structure of organic molecules using different spectroscopic techniques
CH 101.4	Apply the knowledge of fuel, composites, polymers and organic reactions to different industries
CH 101.5	Evaluate theoretical and practical aspects relating to the transfer of chemical products from laboratories to the industrial scale, in accordance with environmental considerations.

Paper Name: Mathematics – I
Paper Code: M 101

COs	Statement
M 101.1	Understand and recall the properties and formula related to matrix algebra, differential calculus, integral calculus and vector algebra. multi variable calculus, vector calculus and infinite series
M 101.2	Determine the solutions of the problems related to matrix algebra, differential calculus, multi variable calculus, vector calculus and infinite series.
M 101.3	Apply the appropriate mathematical tools of matrix algebra ,differential calculus, Integral Calculus, multi variable calculus, vector calculus and infinite series for the solutions of the related problems.
M 101.4	Analyze different engineering problem linked with matrix algebra, differential calculus, Integral Calculus, multi variable calculus, vector calculus,
M101.5	Apply different engineering problems linked with matrix algebra, differential calculus, Integral Calculus, multi-variable calculus, vector calculus.

Paper Name: Communicative English
Paper Code: HU 101

COs	Statement
HU 101.1	Understand and communicate in English through exposure to communication skills theory and practice.
HU 101.2	Understand and apply the basic grammatical skills of the English language and develop reading and comprehension skills.
HU 101.3	Understand and know about and apply the basic formats, templates of business and official communication.
HU 101.4	Understand and know about and employ formal communication modes in meetings and reports.
HU 101.5	Understand and know about and use objective and culturally neutral language in interpersonal and business communication.

Paper Name: Engineering Mechanics
Paper Code: ME 101

COs	Statement
ME 101.1	Construct and understand a free body diagram
ME 101.2	Understand and calculate the reactions necessary to ensure static equilibrium.
ME 101.3	Apply the effect of friction in static and dynamic conditions.
ME 101.4	Analyse the different surface properties, property of masses and material properties.
ME 101.5	Evaluate and solve different problems of kinematics and kinetics

Paper Name: Language Laboratory and Seminar Presentation
Paper Code: HU 191

COs	Statement
HU 191.1	Able to understand advanced skills of Technical Communication in English through Language Laboratory.
HU 191.2	Able to apply listening, speaking, reading and writing skills in societal and professional life.
HU 191.3	Able to demonstrate the skills necessary to be a competent Interpersonal-communicator.
HU 191.4	Able to analyze communication-behaviours.
HU 191.5	Able to adapt to multifarious socioeconomically and professional arenas with the help of effective communication and interpersonal skills.

Paper Name: Chemistry – I Laboratory
Paper Code: CH 191

COs	Statement
CH 191.1	Understand different types of instruments for estimation of small quantities chemicals used in industries, scientific and technical fields.
CH 191.2	Analyze and determine the composition of liquid and solid samples working as an individual and also as a team member.
CH 191.3	Analyze different water quality parameters considering public health and environment
CH 191.4	Synthesize drug and polymer materials considering public health and environmental safety
CH 191.5	Design innovative experiments applying the fundamental theory of chemistry.

Paper Name: Basic Electrical Engineering Laboratory
Paper Code: EE191

COs	Statement
EE 191.1	Identify common electrical components and their ratings.
EE 191.2	Understand the basic characteristics of transformers and electrical machines.
EE 191.3	Understand the usage of common electrical measuring instruments
EE 191.4	Understand the basic characteristics of transformers and electrical machines

Paper Name: Engineering Drawing and Graphics
Paper Code: ME 191

COs	Statement
ME 191.1	Learn the basics of drafting
ME 191.2	Understand the use of drafting tools which develops the fundamental skills of industrial drawings.
ME 191.3	Apply the concept of engineering scales, dimensioning and various geometric curves necessary to understand design of machine elements.
ME 191.4	Analyse the concept of projection of line, surface and solids to create the knowledge base of orthographic and isometric view of structures and machine parts.
ME191.5	Evaluate the design model to different sections of industries as well as for research & development

CO-PO/PSO mapping

Paper Name: Mathematics – I
Paper Code: M 101

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
M 101.1	3	3	2	-								2	2	2
M 101.2	3	3	3	3								2	2	2
M 101.3	3	3	3	3								2	2	2
M 101.4	3	3	3	3								2	2	2
M 101.5	3	3	3	3								2	2	2

Paper Name: Chemistry – I
Paper Code: CH 101

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CH 101.1	3	2	2	2	-	-	-	-	-	-	-	2	-	-
CH 101.2	3	3	3	3	-	-	-	-	-	-	-	2	-	-
CH 101.3	3	3	2	2	-	-	-	-	-	-	-	2	-	-
CH 101.4	3	2	3	2	-	-	-	-	-	-	-	2	-	-
CH 101.5	3	3	3	3	-	-	-	-	-	-	-	2	-	-

Paper Name: Basic Electrical Engineering
Paper Code: EE 101

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 101.1	3	3	3		-	3	-	-	3	-	2	3	2	2
EE 101.2	3	3	2		-	2	-	-	3	-	1	3	1	2
EE 101.3	3	3	3		-	1	-	-	3	-	1	3	3	3

Paper Name: Communicative English
Paper Code: HU 101

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS O1	PSO 2
HU 101.1	-	-	-	-	-	-	2	-	3	3	-	3	2	2
HU 101.2	-	-	-	-	-	-	2	-	3	3	-	3	2	2
HU 101.3	-	-	-	-	-	-	2	-	3	3	-	3	2	2
HU 101.4	-	-	-	-	-	-	2	-	3	3	-	3	2	2
HU 101.5	-	-	-	-	-	-	2	-	3	3	-	3	2	2

Paper Name: Engineering Mechanics
Paper Code: ME 101

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
ME 101.1	3	2	2	2	-	-	-	-	-	-	-	-	-	-
ME 101.2	3	3	2	3	-	-	-	-	-	-	-	-	-	-
ME 101.3	3	3	3	3	-	-	-	-	-	-	-	-	-	-
ME 101.4	3	3	3	3	-	-	-	-	-	-	-	-	-	-
ME101.5	3	3	3	3	-	-	-	-	-	-	-	-	-	-

Paper Name: Language Laboratory and Seminar Presentation
Paper Code: HU 191

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
HU 191.1	-	-	-	-	-	-	2	-	3	3	-	2	2	2
HU 191.2	-	-	-	-	-	-	2	-	3	3	-	2	2	2
HU 191.3	-	-	-	-	-	-	2	-	3	3	-	2	2	2
HU 191.4	-	-	-	-	-	-	2	-	3	3	-	2	2	2
HU 191.5	-	-	-	-	-	-	2	-	3	3	-	2	2	2

Paper Name: Chemistry – I Laboratory
Paper Code: CH 191

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CH 191.1	2	2	3	2	-	2	-	-	-	-	-	2	-	-
CH 191.2	2	2	3	2	-	2	-	-	-	-	-	2	-	-
CH 191.3	2	2	3	2	-	2	-	-	-	-	-	2	-	-
CH 191.4	2	2	3	2	-	2	-	-	-	-	-	2	-	-
CH 191.5	3	3	3	3	-	2	-	-	-	-	-	2	-	-

Paper Name: Basic Electrical Engineering Laboratory
Paper Code: EE191

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 191.1	2	2	3	3	-	2	-	-	3	3	-	2	2	2
EE 191.2	3	3	2	3	-	2	-	-	3	3	-	3	2	2
EE 191.3	2	3	3	2	-	2	-	-	2	3	-	2	2	2
EE 191.4	2	3	3	2	-	2	-	-	2	3	-	2	2	2

Paper Name: Engineering Drawing and Graphics
Paper Code: ME 191

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
ME 191.1	2	-	-	2	-	-	-	-	-	-	-	-	-	-
ME 191.2	2	-	-	2	-	-	-	-	-	-	-	-	-	-
ME 191.3	3	-	-	2	-	-	-	-	-	-	-	-	-	-
ME 191.4	3	-	-	3	-	-	-	-	-	-	-	-	-	-
ME 191.5	3	2	-	3	2	-	-	-	-	-	-	-	-	-

B.Tech Second Semester Curriculum

Sl. No.	Paper Code	Course Name	Contact Hours/Week				Credit Points
			L	T	P	Total	
A. THEORY							
1	M 201	Mathematics – II	3	1	0	4	4
2	CH 201 / PH 201	Chemistry – I (Gr. B) / Physics – I (Gr. A)	3	1	0	4	4
3	EE 201 / EC 201	Basic Electrical Engineering (Gr. B) / Basic Electronics Engineering (Gr. A)	3	1	0	4	4
4	CS 201	Computer Fundamentals and Principle of Computer Programming	3	1	0	4	4
5	ME 201	Engineering Thermodynamics and Fluid Mechanics	3	1	0	4	4
Total of Theory						**20**	**20**
B. PRACTICAL							
6	CS 291	Computer Fundamentals and Principle of Computer Programming Laboratory	0	0	3	3	2
7	CH 291 / PH 291	Chemistry – I Laboratory (Gr. B) / Physics – I Laboratory (Gr. A)	0	0	3	3	2
8	EE 291 / EC 291	Basic Electrical Engineering Laboratory (Gr. B) / Basic Electronics Engineering Laboratory (Gr. A)	0	0	3	3	2
9	ME 291 / ME 292	Engineering Drawing and Graphics (Gr. B) / Workshop Practice (Gr. A)	0	0	3	3	2
Total of Practical						**12**	**8**
C. SESSIONAL							
10	MC 281	Soft Skill Development	0	0	2	2	0
Total of Theory, Practical & Mandatory Activities / Courses						**34**	**28**

Paper Name: Mathematics-II
Paper Code: M 201

COs	Statement
M 201.1	Determineandrecallthepropertiesandformularelatedto Ordinarydifferentialequations, Basic Graph Theory and Laplace transform.
M 201.2	Determinethesolutionsoftheproblemsrelatedto Ordinarydifferentialequations, Basic Graph Theory and Laplace transform.
M 201.3	Applyappropriatemathematicaltoolsof Ordinarydifferentialequations, Basic Graph Theory and Laplace transform.
M201.4	Analyze engineering problems on Ordinary differential equations, Basic Graph Theory and Laplace transform.
M201.5	Applyengineeringsolutionsbyusing Ordinarydifferentialequations,Basic Graph Theory and Laplace transform.

Paper Name: Physics – I
Paper Code: PH 201

COs	Statement
PH 201.1	Describe different types of mechanical resonance and its electrical equivalence
PH 201.2	Explain basic principles of Laser, Optical fibres and Polarization of light
PH 201.3	Apply superposition principle to explain the phenomena of interference and diffraction
PH 201.4	Analyze different crystallographic structures according to their co-ordination number and packing factors
PH 201.5	Determine and justify the need of aquantum mechanics as remedy to overcome limitations imposed by classical physics

Paper Name: Basic Electronics Engineering
Paper code: EC201

COs	Statement
EC 201.1	Study PN junction diode, ideal diode, diode models and its circuit analysis, application of diodes and special diodes.
EC 201.2	Learn how operational amplifiers are modeled and analyzed, and to design Op- Amp circuits to perform operations such as integration, differentiation on electronic signals.
EC 201.3	Study the concepts of both positive and negative feedback in electronic circuits.
EC201.4	Develop the capability to analyze and design simple circuits containing non- linear elements such as transistors using the concepts of load lines, operating points and incremental analysis
EC 201.5	Learn how the primitives of Boolean algebra are used to describe the processing of binary signals

Paper Name: Computer Fundamentals and Principle of Computer Programming
Paper Code: CS 201

COs	Statement
CS 201.1	Understanding the concept of input and output devices of Computers and how it works and recognize the basic terminology used in computer programming.
CS 201.2	Write, Compile and Debug programs in C language and use different data types for writing the programs.
CS 201.3	Design programs connecting decision structures, loops and functions.
CS 201.4	Explain the difference between call by value and call by address.
CS 201.5	Understand the dynamic behavior of memory by the use of pointers.

Paper Name: Engineering Thermodynamics and Fluid Mechanics
Paper Code: ME 201

COs	Statement
ME201.1	Know about thermodynamic equilibrium, heat & work transfer, First law and its application.
ME201.2	Understand the basic concepts of Heat Engine, Entropy from Second law of thermodynamics.
ME201.3	Know the thermodynamic characteristics of a pure substance and its application in power cycles (Simple Rankine cycles, Air Standard cycles).
ME201.4	Knowledge of basic principles of fluid mechanics, and ability to analyze fluid flow problems with the application of the momentum and energy equations.
ME201.5	Evaluate and solve different problems of kinematics and kinetics

Paper Name: Physics – I Laboratory
Paper Code: PH 291

COs	Statement
PH291.1	Demonstrate experiments allied to their theoretical concepts
PH291.2	Conduct experiments using LASER, Optical fiber, Torsional pendulum, Spectrometer
PH291.3	Analyze and participate as an individual and as a member or leader in groups in laboratory sessions actively.
PH291.4	Analyze experimental data from graphical representations, and to communicate effectively them in Laboratory reports including innovative experiments.
PH291.5	Develop critical thinking skills to solve for real life challenges.

Paper Name: Computer Fundamentals and Principle of Computer Programming Laboratory
Paper Code: CS291

COs	Statement
CS 291.1	Understanding the working of different operating systems like DOS, Windows, Linux.
CS 291.2	Write, Compile and Debug programs in C language.
CS 291.3	Design programs connecting decision structures, loops.
CS 291.4	Exercise user defined functions to solve real time problems.
CS 291.5	Inscribe C programs using Pointers to access arrays, strings, functions, structures and files.

Paper Name: Basic Electronics Engineering Laboratory
Paper Code: EC 291

COs	Statement
EC291.1	Knowledge of Electronic components such as Resistors, Capacitors, Diodes, Transistors measuring equipment like DC power supply, Multimeter, CRO, Signal generator, DC power supply.
EC291.2	Analyze the characteristics of Junction Diode, Zener Diode, BJT & FET and different types of Rectifier Circuits.
EC291.3	Determination of input-offset voltage, input bias current and Slew rate, Common- mode Rejection ratio, Bandwidth and Off-set null of OPAMPs.
EC291.4	Able to know the application of Diode, BJT & OPAMP.
EC291.5	Familiarization and basic knowledge of Integrated Circuits

Paper Name: Workshop Practice
Paper Code: ME 292

COs	Statement
ME291.1	Gain basic knowledge of Workshop Practice and Safety useful for our daily living.
ME291.2	Understand the use of Instruments of a pattern shop like Hand Saw, Jack Plain, Chisels etc.
ME291.3	Apply and performing operations like such as Marking, Cutting etc used in manufacturing processes.
ME291.4	Analyse the various operations in the Fitting Shop using Hack Saw, various files, Scriber, etc to understand the concept of tolerances applicable in all kind of manufacturing.
ME291.5	Get hands on practice of in Welding and apply various machining processes which give a lot of confidence to manufacture physical prototypes in project works.

CO-PO/PSO mapping

Paper Name: Mathematics-II
Paper Code: M 201

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
M 201.1	3	3	2	-	-	-	-	-	-	-	-	2	2	2
M 201.2	3	3	3	3	-	-	-	-	-	-	-	2	2	2
M 201.3	3	3	3	3	-	-	-	-	-	-	-	2	2	2
M 201.4	3	3	3	3	-	-	-	-	-	-	-	2	2	2
M 201.5	3	3	3	3	-	-	-	-	-	-	-	2	2	2

Paper Name: Physics – I
Paper Code: PH 201

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
PH 201.1	3	3	2	2	-	-	-	-	-	-	-	-	-	-
PH 201.2	3	3	2	2	-	-	-	-	-	-	-	-	-	-
PH 201.3	3	3	2	2	-	-	-	-	-	-	-	-	-	-
PH 201.4	3	3	2	2	-	-	-	-	-	-	-	-	-	-
PH 201.5	3	3	2	2	-	-	-	-	-	-	-	-	-	-

Paper Name: Basic Electronics Engineering
Paper code: EC201

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC 201.1	3	3	2		-	-	-	-		-	-	2		
EC 201.2	3	3	2		-	-	-	-		-	-	2		
EC 201.3	3	3	2		-	-	-	-	2	-	-	2		
EC 201.4	3	3	2		-	-	-	-	2	-	-	2		
EC 201.5	3	3	2		-	-	-	-	2	-	-	2		

Paper Name: Engineering Thermodynamics and Fluid Mechanics
Paper Code: ME 201

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
ME 201.1	3	2	2	2	-	-	-	-	-	-	-	-	-	-
ME 201.2	3	3	2	3	-	-	-	-	-	-	-	-	-	-
ME 201.3	3	3	3	3	-	-	-	-	-	-	-	-	-	-
ME 201.4	3	3	3	3	-	-	-	-	-	-	-	-	-	-
ME 201.5	3	3	3	3	-	-	-	-	-	-	-	-	-	-

Paper Name: Computer Fundamentals and Principle of Computer Programming
Paper Code: CS 201

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS 201.1	3	2	3	2	-	-	-	-	3	-	-	3	-	-
CS 201.2	2	3	3	2	-	-	-	-	3	-	-	2	-	-
CS 201.3	2	3	3	3	-	-	-	-	2	-	-	2	-	-
CS 201.4	3	2	3	2	-	-	-	-	3	-	-	3	-	-
CS 201.5	3	3	3	3	-	-	-	-	3	-	-	3	-	-

Paper Name: Computer Fundamentals and Principle of Computer Programming Laboratory
Paper Code: CS291

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS 291.1	3	3	-	-	-	2	-	-	3	2	3	3	2	-
CS 291.2	3	2	-	-	-	3	-	-	3	3	3	2	3	-
CS 291.3	2	3	-	-	-	2	-	-	3	3	3	2	3	-
CS 291.4	2	3	-	-	-	3	-	-	3	3	3	2	2	-

Paper Name: Physics – I Laboratory
Paper Code: PH 291

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
PH291.1	2	3	2	3	3	-	-	-	-	-	-	-	-	-
PH291.2	2	3	2	3	3	-	-	-	-	-	-	-	-	-
PH291.3	2	3	2	3	3	-	-	-	-	-	-	-	-	-
PH291.4	2	3	2	3	3	-	-	-	-	-	-	-	-	-
PH291.5	2	3	2	3	2	-	-	-	-	-	-	-	-	-

Paper Name: Basic Electronics Engineering Laboratory
Paper Code: EC 291

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC 291.1	3	3	-	-	-	-	-	-	3	3	-	3	3	3
EC 291.2	3	3	-	-	-	-	-	-	3	2	-	3	3	3
EC 291.3	3	3	-	-	-	-	-	-	3	2	-	3	2	2
EC 291.4	2	3	-	-	-	-	-	-	3	2	-	3	2	3
EC 291.5	2	2	-	-	-	-	-	-	3	3	-	2	2	2

Paper Name: Workshop Practice
Paper Code: ME 292

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
ME 292.1	3	-	-	-	-	-	2		2	2	-	-	-	-
ME 292.2	3	-	-	-	-	-	2		2	2	-	-	-	-
ME 292.3	3	-	-	-	-	-	2		2	2	-	-	-	-
ME 292.4	3	-	-	-	-	-	2		2	2	-	-	-	-
ME 292.5	3	2	2	-	-	-	2		2	2	-	-	-	-

Paper Name: Physics – I Laboratory
Paper Code: PH 291

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
PH 291.1	2	2	2	-	-	-	-	2	3	3	-	2	3	2
PH 291.2	3	3	2	-	-	-	-	2	3	3	-	2	3	2
PH 291.3	3	3	2	-	-	-	-	2	3	3	-	3	3	3
PH 291.4	2	2	3	-	-	-	-	2	2	3	-	2	2	3

B.Tech Third Semester Curriculum

A.THEORY								
Sl no	Field	Code	Subjects	Contact hours/week				Creditpoints
				L	T	P	Total	
1	BS	M 301	Mathematics – III	3	1	0	4	4
2	BS	M(CS) 301	Numerical Methods	3	0	0	3	3
3	PC	EI 301	Analog Electronic Circuits	3	0	0	3	3
4	PC	EI 302	Digital Electronic Circuits	3	0	0	3	3
5	PC	EI 303	Circuit Theory and Networks	3	1	0	4	4
6	PC	EI 304	Electrical & Electronic Measurement & Instrumentation	3	1	0	4	4
Total Theory							21	21
B.PRACTICAL								
	Field	Code	Subjects	Contact hours/week				Credit Points
				L	T	P	Total	
7	BS	M(CS)391	Numerical Methods Lab	0	0	3	3	2
8	PC	EI 391	Analog Electronic Circuits Lab	0	0	3	3	2
9	PC	EI 392	Digital Electronic Circuits Lab	0	0	3	3	2
10	PC	EI 393	Circuits and Networks Lab	0	0	3	3	2
C.SESSIONAL								
	Field	Code	Subjects	Contact hours/week				Credit Points
				L	T	P	Total	
11	MC	MC381						0
Total practical							14	8
Total 3rd Semester							35	29

Paper Name: Mathematics – III
Paper Code: M301

COs	Statement
M 301.1	Recall the distinctive characteristics of mathematical approaches like Fourier Series & Fourier Transform, Calculus of Complex Variables, Probability Distribution, Correlation & Regression, Ordinary Differential Equation, Partial Differential Equations.
M 301.2	Understand the theoretical workings of mathematical approaches like Fourier Series & Fourier Transform, Calculus of Complex Variables, Probability Distribution, Correlation & Regression, Ordinary Differential Equations, and Partial Differential Equations to evaluate the various measures in related field.
M 301.3	Apply various principles of Fourier Series & Fourier Transform, Calculus of Complex Variables, Probability Distribution, Correlation & Regression, Ordinary Differential Equations, Partial Differential Equations to solve various problems.

Paper Name: Numerical Methods
Paper Code: M(CS)301

COs	Statement
M(CS)301.1	Recall the distinctive characteristics of various numerical techniques and the associated error measures.
M(CS)301.2	Understand the theoretical workings of various numerical techniques and to solve the engineering problems.
M(CS)301.3	Apply the principles of various numerical techniques to solve various problems.

Paper Name: Analog Electronic Circuits
Paper Code: EI 301

COs	Statement
EI 301.1	Define significance of Op Amps and their importance.
EI 301.2:	Circuit building using Analog IC's.
EI 301.3	In-depth knowledge of applying the concepts in real time applications.
EI 301.4	Able to use OP Amp to generate sine waveform, Square wave form, Triangular wave forms and design the analog to digital and digital to analog converter and vice versa.

Paper Name: Digital Electronic Circuits
Paper Code: EI 302

COs	Statement
EI 302.1	On completion of this course, the students have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
EI 302.2	To understand and examine the structure of various number systems and its application in digital design.
EI 302.3	The ability to understand, analyze and design various combinational and sequential circuits.
EI 302.4	Ability to identify basic requirements for a design application and propose a cost effective solution.
EI 302.5	Have knowledge on Programmable Logic devices and its usage.

Paper Name: Circuit theory and networks
Paper Code: EI 303

COs	Statement
EI 303.1	Solve complex circuit problem by applying knowledge of circuit theorems.
EI 303.2	Analyze dynamic performance of the networks using Laplace Transform.:
EI 303.3	Find out resonance of different circuit.
EI 303.4	Analyze two port networks using A,B,C,D and Z,Y Parameter Model.
EI 303.5	Design different types of filters.

Paper Name: Electrical & Electronic Measurement &Instrumentation
Paper Code: EI304

COs	Statement
EI 304.1	Use instruments measuring instruments according to the need of specificapplication.
EI 304.2	Calibrate and standardize the instruments.
EI 304.3	Design measuring instruments on requirement basis.
EI 304.4	To measure different parameters from the simulated instrumentation systems using virtualinstrumentation.

Paper Name: Analog Electronics Lab
Paper Code: EI 391

COs	Statement
EI 391.1	Verify the working of diodes, transistors and their applications.
EI 391.2	Build a common emitter/base/collector amplifier and measure its voltage gain.
EI 391.3	Explore the operation and advantages of operational amplifiers.
EI 391.4	To design different types of filters and apply the same to oscillators and amplifiers.
EI 391.5	Exploring the circuitry which converts an analog signal to digital signal.

Paper Name: Digital Electronic Circuits Lab
Paper Code: EI 392

COs	Statement
EI 391.1	Have an ability to operate laboratory equipment.
EI 391.2	Have an ability to the designed digital circuits.
EI 391.3	Have an ability to construct, analyse, and troubleshoot the digital circuits.
EI 391.4	Have ability to measure and record the experimental data, analyse the resultsand prepare a formal laboratory report.

Paper Name: Circuits and Networks Lab
Paper Code: EI 393

COs	Statement
EI 393.1	Use the techniques and skills of modern engineering tools necessary for engineering practice.
EI 393.2	Identify, formulate and solve engineering problems with simulation.
EI 393.3	Find transient response of series /parallel R-L-C circuit using simulation software.
EI 393.4	Find frequency response of different filters using simulation software

Paper Name: Technical Skill Development
Paper Code: MC 381

COs	Statement
MC 381.1	Student will be able to Explain commonly used signals through mathematically.
MC 381.2	Student will be able to determine the response of LSI system using convolution.
MC 381.3	Student will use the tool to analyse continuous-time and discrete-time Fourier series.
MC 381.4	Student will be able to develop the continuous-time and discrete-time signals and systems.

CO-PO/PSO mapping

Paper Name: Mathematics – III
Paper Code: M 301

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
M 301.1	3	2	-	-	-	-	-	-	-	-	-	1
M 301.2	3	2	-	-	-	-	-	-	-	-	-	1
M 301.3	3	2	2	-	-	-	-	-	-	-	-	1

Paper Name: Numerical Methods
Paper Code: M(CS)301

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
M(CS) 301.1	3	2	-	-	-	-	-	-	-	-	-	1
M(CS) 301.2	3	2	-	-	-	-	-	-	-	-	-	1
M(CS) 301.3	3	2	2	-	-	-	-	-	-	-	-	1

Paper Name: Analog Electronic Circuits
Paper Code: EI 301

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PS O1	PS O2
EI301.1	-	-	2	-	-	-	-	-	-	-	-	-	3	3
EI301.2	1	-	1	3	-	-	-	-	-	-	-	-	3	2
EI301.3	-	2	-	-	-	-	-	-	-	-	-	-	2	3
EI301.4	1	-	-	3	-	-	-	-	-	-	-	-	3	3

Paper Name: Digital Electronic Circuits
Paper Code: EI 302

CO	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2
EI302.1	2	2	1	1	1	1	1	1	1	1	1	2	3	3
EI302.2	3	3	1	1	2	1	1	1	1	1	1	2	2	2
EI303.3	3	3	2	2	3	1	1	1	1	1	1	2	2	2
EI302.4	2	2	3	2	2	1	1	1	1	2	1	3	2	1

EI302.5	2	2	1	2	2	1	1	1	1	2	1	1	2	2

Paper Name: Circuit theory and networks
Paper Code: EI 303

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EI303.1	3	2	2	1	1	-	-	-	-	-	-	-	1	1
EI303.2	3	2	1	2	2	-	-	-	-	-	-	-	1	1
EI 303.3	3	2	2	1	1	-	-	-	-	-	-	-	1	1
EI 303.4	3	2	1	1	1	-	-	-	-	-	-	-	1	1
EI 303.5	3	2	3	1	1	-	-	-	-	-	-	-	3	2

Paper Name: Electrical & Electronic Measurement &Instrumentation
Paper Code: EI304

CO	PO1	PO2	PO3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
EI 304.1	3	3	1	2	1	1	1	1	1	1	1	3	1	1
EI 304.2	3	3	1	3	1	1	1	1	1	1	1	3	1	1
EI 304.3	3	2	3	3	1	1	1	1	1	1	1	3	1	1
EI 304.4	3	3	1	3	1	1	1	1	1	1	1	3	1	1

Paper Name: Technical Skill Development
Paper Code: MC 381

CO Vs PO, PSO MAPPING FOR MC381															
COs for the course	Statement	PO 1	PO 2	PO 3	PO4	PO5	PO 6	PO 7	PO 8	PO 9	P1 0	P1 1	P1 2	PSO1	PSO 2
MC381.1	Analyze the properties of different Continuous Time signals	2	2	1	3	-	2	1	1	1	1	2	-	1	1
MC381.2	Demonstrate the properties of different Continuous systems	2	2	2	3	2	1	1	1	1	1	1	1	2	1
MC381.3	Determine Continuous Time signals &systems in Timedomain	3	1	2	1	2	2	1	1	1	-	1	1	1	2
MC381.4	Investigate Continuous Time systems in the Frequency domain using Fourier Analysis tools	2	3	2	2	2	1	2	1	1	2	1	-	1	2

B.Tech Fourth Semester Curriculum

A.THEORY								
Sl no	Field	Code	Subjects	Contact hours/week				Creditpoints
				L	T	P	Total	
1	BS	PH401	Physics – II	3	0	0	3	3
2	PC	EI 401	Sensors and Transducers	3	1	0	4	4
3	PC	EI 402	Microprocessors andMicrocontrollers	3	1	0	4	4
4	PC	EI403	Electromagnetic Theory and Transmission Line	3	0	0	3	3
5	PC	EI404	Signals & systems	3	0	0	3	3
Total Theory							17	17
B.PRACTICAL								
Sl no	Field	Code	Subjects	Contact hours/week				Credit Points
				L	T	P	Total	
6	BS	PH 491	Physics –II Lab	0	0	3	3	2
7	PC	EI 491	Sensors and Transducers Lab	0	0	3	3	2
8	PC	EI 492	Microprocessor and Microcontrollers Lab	0	0	3	3	2
9	PC	EI493	Electrical & Electronic Measurement & Instrumentation Lab	0	0	3	3	2
C.SESSIONAL								
	Field	Code	Subjects	Contact hours/week				Credit Points
				L	T	P	Total	
10	HU	HU 481	Technical report writing &language practice laboratory	0	0	2	2	1
Total practical							14	9
Total 4th semester							31	26

Paper Name: Physics – II
Paper Code: PH 401

COs	Statement
PH 401.1	State a) Basic postulates of Quantum Mechanics b) Macro state and micro state for thermodynamic system. c) Thermodynamic probability and phase space d) Properties of Nano material. e) Polarization f) Bloch Theorem g) Assumptions of Kronig-Penny Model
PH 401.2	Explain a) Energy levels and energy states. b) Distribution functions of Classical and quantum statistics. c) Concept of quantum well, quantum wire and quantum dots. d) Quantum confinement. e) Different types of polarizability. f) Dielectric loss. g) Ferroelectric and Piezoelectric materials. h) Ferromagnetic Hysteresis Loop i) E-k diagram and Brillouin zone and crystal momentum j) Nuclear Binding Energy
PH 401.3	Apply the knowledge of a) Schrödinger equation in problems of junction diode, tunnel diode, 1-D potential box, 3-D potential box. b) Nano-range and various types of nano materials. c) Fermi Dirac statistics to metals and semiconductors. d) Local electric field and Lorentz field in Clausius-Mossotti equation. e) M, B , H and χ in realizing Curie law for different magnetic materials f) Weiss molecular field theory in realizing Curie- Weiss law for Ferromagnetic materials Soft and hard ferromagnets in different storage devices and other applications. g) Free electron theory in deriving Weidemann and Franz law, h) Kronig-Penny Model to classify different solid materials (metal, semiconductor, and insulator) based on characteristics of allowed and forbidden energy band. i) Hall Effect to interpret its application in various real life situations. j) Liquid drop model in Nuclear Fission and Fusion
PH 401.4	Analyze a) Behavior of dielectric under alternating field. b) Hysteresis curve to describe properties of hard and soft ferromagnets. c) Outcome of negative effective mass value to realize existence of both electron and holes in certain solids.
PH 401.5	To evaluate a) Under certain conditions quantum statistics collapses to classical statistics b) Diamagnetic, Paramagnetic and Ferromagnetic materials. c) Sommerfeld's energy quantization theorem to overcome the limitations of classical free electron theory (Drude's Theory)

Paper Name: Sensors and Transducers
Paper Code: EI 401

COs	Statement
EI 401.1	Students should be able to illustrate the fundamental principles of various types of sensors.
EI 401.2	Students should be able to compare the different types of transducers available.
EI 401.3	Students should be familiar with criteria to recommend appropriate sensors to perform engineering tasks and scientific researches.
EI 401.4	Students will be able to understand the design of different Sensors.

Paper Name: Microprocessors and Microcontrollers
Paper Code: EI 402

COs	Statement
EI 402.1	Understanding the history and need of 8085/8086 microprocessors and 8051 microcontroller with their internal architecture and various addressing modes.
EI 402.2	Analyzing various instructions and programs.
EI 402.3	Applying the knowledge for communicating various real time applications through interfacing techniques.
EI 402.4	Designing various systems based on microprocessors and microcontroller.

Paper Name: Electromagnetic Theory and Transmission Line
Paper Code: EI-403

COs	Statement
EI403.1	Student will be able to understand and interpret the physical meanings of gradient, divergenceand curl, vector calculus and orthogonal coordinates.
EI403.2	Student will be able to understand steady fields and different associated laws, its applications and physical significances of Maxwell's equations for static field.
EI403.3	Student will be able to understand the time varying fields and correlate the Poynting vector and Poynting theorem.
EI403.4	Student will be able to understand the thorough treatment of the theory of electro dynamics, mainly from a classical field theoretical point of view, and includes such things as electrostatics

	and magnetostatics, boundary conditions.
EI403.5	Student will be able to understand the wave equations, application of E.M. theory intransmission line, wave guide concept.
EI403.6	Student will be able to understand electromagnetic theory and explains universal concepts in three-dimension real world, i.e.,electro-magnetic wave propagation in free-space, dielectrics,conductors.

Paper Name: Signals And Systems
Paper Code: EI-404

COs	Statement
EI 404.1	Student will be able to describe commonly used signals mathematically and understand he classification of signals and how to perform mathematical operations on the signal and system.
EI 404.2	Student will be able to classify systems based on their properties and determine the response of LSI system using convolution.
EI 404.3	: Student will understand continuous-time and discrete-time Fourier series/transforms:
EI 404.4	Student will understand the process of sampling and the effects of under sampling.
EI 404.5	Student will be able to apply Z- transform for analyze of continuous-time and discrete-time signals and systems.

Paper Name: Physics –II Lab
Paper Code: PH 491

COs	Statement
PH 491.1	Demonstrate a) Dipolar magnetic behavior b) Action of capacitors c) Fermi levels and band gap in a semiconductor d) Function of Light emitting diode e) Magnetic and semiconductor storage devices f) Motion of electron under cross fields
PH 491.2	Conduct experiments using a) Insulators, Semiconductors (extrinsic and intrinsic), Light emitting diodes b) Cathode ray oscilloscope c) Various types of magnetic materials
PH 491.3	Function effectively as an individual, and as a member or leader in laboratory sessions
PH 491.4	Communicate effectively, write reports and make effective presentation using available technology a) on presentation of laboratory experiment reports

	b) On presentation of innovative experiments

Paper Name: Sensors and Transducers Lab
Paper Code: EI 491

COs	Statement
EI 491.1	To enable the students practically to know about transducers and about the types of transducersand various transducers used for the measurement of various physical quantities.
EI 491.2	Students should be able to analyse the measurement resultsby using each of the transducers.
EI 491.3	Students should possess a reasonable level of competence in the design, construction, andexecution of a sensor based project.
EI 491.4	Students should be able to design a mini project as per their understanding and competence.

Paper Name: Microprocessor and Microcontrollers Lab
Paper Code: EI 492

COs	Statement
EI 492.1	Design microcontroller based innovative projects.
EI 492.2	To write any complex programs.
EI 492.3	To develop awareness for advantages and disadvantages using different series of microprocessors and microcontrollers.

Paper Name: Electronic Measurement & Instrumentation Lab
Paper Code: EI 493

COs	Statement
EI 493.1	Calibrate different electrical meters.
EI 493.2	Use Digital Storage Oscilloscope for measuring and storing different waveforms.
EI 493.3	Measure different static and dynamic characteristics of any measuring instrument.

Paper Name: Technical Report Writing & Language Practice
Paper Code: HU481

COs	Statement
HU481.1	To maximize exposure and train students in the professional use of English in the globalizedworkplace.
HU481.2	To maximize listening and speaking skills training, including pronunciation.
HU481.3	To instill understanding of the basics of written communication and presentation in theorganizational perspective.

CO-PO/PSO mapping

Paper Name: Physics – II
Paper Code: PH 401

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
PH(EE) 401.1	3	-	-		3	2	2	-	-	-	-	-	-	-
PH(EE) 401.2	3	-	-	3	3	2	2	-	-	-	-	-	-	-
PH(EE) 401.3	3	-	-	-	3	2	2	-	-	-	-	-	3	3
PH(EE) 401.4	-	2	-	-	3	2	2	-	-	-	-	-	-	-
PH(EE) 401.5	-	3	-	3	3	2	2	-	-	-	-	-	-	-

Paper Name: Sensors and Transducers
Paper Code: EI 401

CO	PO1	PO2	PO 3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EI 401.1	2	3	1	2	-	-	-	-	-	-	-	-	2	2
EI 401.2	1	1	-	3	2	2	1	-	-	-	-	-	2	-
EI 401.3	1	2	3	1	2	2	-	-	-	-	-	-	-	3
EI 401.4	2	2	2	1	3	-	-	-	-	-	-	2	2	1

Paper Name: Microprocessors and Microcontrollers
Paper Code: EI402

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PS O1	PS O2
EI 402.1	3	2	2	2	2	2	1	1	1	1	1	3	1	1
EI 402.2	3	3	2	3	2	2	1	1	1	1	1	3	1	1
EI 402.3	3	2	3	2	2	2	1	1	1	1	1	3	1	1
EI 402.4	3	2	3	3	2	2	1	1	1	1	1	3	1	1

Paper Name: Electromagnetic Theory and Transmission Line
Paper Code: EI-403

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PS O1	PS O2
EI 403.1	3	3	1	2	1	1	1	1	1	1	1	2	1	1
EI 403.2	3	3	1	3	1	1	1	1	1	1	1	2	1	1
EI 403.3	3	3	1	3	1	1	1	1	1	1	1	2	1	1
EI 403.4	3	3	1	3	1	1	1	1	1	2	1	3	1	1
EI 403.5	3	3	2	3	2	1	1	1	1	2	1	1	3	2
EI 403.6	3	3	2	3	2	2	1	1	1	1	1	1	1	1

Paper Name: Signals And Systems
Paper Code: EI-404

COs for Course C3	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PS O1	PS O2
EI404.1	3	2	3	2	-	-	-	-	-	-	-	1	2
EI404.2	3	2	3	2	-	-	-	-	-	-	-	1	2
EI404.3	3	1	3	2	-	-	-	-	-	-	-	1	3
EI404.4	3	1	2	2	-	-	-	-	-	-	-	1	3
EI404.5	3	1	2	3	-	-	-	-	-	-	-	1	3

Paper Name: Physics – II Lab
Paper Code: PH 491

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PH 491.1	3	2	-	-	-	-	-	-	-	-	-	1
PH 491.2	1	2	-	3	-	-	-	-	-	-	-	1
PH 491.3	1	2	-	-	-	-	-	-	3	-	-	1
PH 491.4	1	2	-	-	-	-	-	-	-	3	-	1
PH 491.5	1.5	2	-	3	-	-	-	-	3	3	-	1

Paper Name: Technical Report Writing & Language Practice
Paper Code: HU481

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO.1	3	-	-	3	**-**	**3**	**-**	**-**	**3**	**3**	**-**	**-**
CO.2	2	3	2	3	**-**	**3**	**-**	**-**	**2**	**3**	**-**	1
CO.3	1	3	-	3	**-**	**2**	**-**	**-**	**2**	**3**	**-**	1

B.Tech Fifth Semester Curriculum

A.THEORY								
Sl no	Field	Code	Subjects	Contact hours/week				Creditpoints
				L	T	P	Total	
1	HS	HU501	Environmental Science	2	0	0	2	2
2	PC	EI 501	Industrial Instrumentation	3	0	0	3	3
3	PC	EI 502	Analog & Digital Communication Theory	3	0	0	3	3
4	PC	EI 503	Control Engineering	3	0	0	3	3
5	PE	EI 504A /EI 504B/ EI 504C	Digital Signal Processing/ Microwave Engineering/ Antenna Theory & Propagation	3	0	0	3	3
Total Theory							14	14
B.PRACTICAL								
Sl no	Field	Code	Subjects	Contact hours/week				Credit Points
				L	T	P	Total	
6	PC	EI 591	Industrial Instrumentation Lab	0	0	3	3	2
7	PC	EI 592	Analog & Digital Communication Lab	0	0	3	3	2
8	PC	EI 593	Control Engineering Lab	0	0	3	3	2
9	PE	EI 594A / EI 594B / EI 594C	Digital Signal Processing Lab / Microwave Engineering Lab/ Antenna & Propagation Lab	0	0	3	3	2
C.SESSIONAL								
	Field	Code	Subjects	Contact hours/week				Credit Points
				L	T	P	Total	
10	**MC**	MC581	Technical Skill development-II	2	0	0	2	0
Total practical							14	8
Total 5th Semester							28	22

Paper Name: Environmental Science
Paper Code: HU 501

COs	Statement
HU501.1	Study the mathematics and calculations of population growth, material balance and sustainable development.
HU501.2	Study the components and diversity of eco system.
HU501.3	Study the fundamental knowledge of air pollution, calculations of earth's surface temperature, atmospheric window and lapse rate.
HU501.4	Acquire fundamental knowledge of water pollution and its consequences knowledge and calculations regarding BOD, COD.
HU501.5	Understand the basic concepts regarding noise and musical sound, decibel unit and its relation with sound intensity, reasons and consequences of noise pollution.
HU501.6	Understand the concepts of land pollution and its remedies.

Paper Name: INDUSTRIAL INSTRUMENTATION
Paper Code: EI501

COs	Statement
EI501.1	Able to explain working principle of different measuring instruments
EI501.2	Able to Describe the specification of different instruments and advantages and disadvantages.
EI501.3	Able to Measure different physical parameters like pressure, temperature, flow rate, level etc:
EI501.4	Able to install the instrument

Paper Name: ANALOG & DIGITAL COMMUNICATION THEORY
Paper Code: EI502

COs	Statement
C502.1	Able to analyze the performance of a baseband and pass band communication system in terms oferror rate and spectral efficiency.
C502.2	Able to perform the time and frequency domain analysis of the signals in a communication system.
C502.3	Able to select the blocks in a design of communication system.
C502.4	Able to analyze Performance of spread spectrum communication system.

Paper Name: CONTROL ENGINEERING
Paper Code: EI 503

COs	Statement
EI503.1	Able to apply Laplace transform and state space techniques to model dynamic systems.
EI503.2	Able to understand of the fundamentals of control systems.
EI503.3	Able to determine the time domain responses of first and second-order systems.
EI503.4	Able to analyze the system behavior in frequency domain.
EI503.5	Able to manipulate the system stability using compensator.

Paper Name: DIGITAL SIGNAL PROCESSING
Paper Code: EI 504A

COs	Statement
EI 504A.1	Apply the knowledge about continuous and discrete time signals
EI 504A.2	Understand the Fourier Transform, and examine the process of Quantization and the effects of finite register length
EI 504A.3	Understand and implement DFTs on long data sets such as speech signals and images.
EI 504A.4	Develop different types of FIR & IIR filter structures and their implementations
EI 504A.5	Use of FFTs for efficient implementation of linear convolution.
EI 504A.6	Excel in fields such as speech processing, audio signal processing, digital image processing, video and audio compression.

Paper Name: RF & MICROWAVE ENGINEERING
Paper Code: EI504B

COs	Statement
EI504B.1	Able to understand and analyze Planar transmission lines and High frequency circuit elements.
EI504B.2	Able to illustrate the construction and working principle of Microwave tubes, Semiconductor Microwave Devices and their typical characteristics and applications.
EI504B.3	Able to understand the application of microwaves as a Duplexer, Radar etc.
EI504B.4	Able to demonstrate the measuring techniques of microwave devices such as Detector, Power meter and sensors, Slotted line, Spectrum analyzer, Mixer, Network analyzer.

Paper Name: INDUSTRIAL INSTRUMENTATION LAB
Paper Code: EI 591

COs	Statement
EI 591.1	Able to calibrate different instruments.
EI 591.2	Able to measure different industrial parameter like pressure, temperature, flow,level etc.
EI 591.3	Able to understand the working principle of different instruments.
EI 591.4	Able to choose the suitable instrument for desired measuring parameter.

Paper Name: ANALOG & DIGITAL COMMUNICATION LAB
Paper Code: EI 592

COs	Statement
EI592.1	To learn signal and linear time invariant system properties.
EI592.2	Study, design, and build modulation systems examining trade-offs indifferent communication systems.
EI592.3	To be able to perform experiments in converting analog informationinto digital data via sampling, quantization, and coding.
EI592.4	To be able to choose necessary modulation technique for specificsignal transmission.

Paper Name: CONTROL ENGINEERING LABORATORY
Paper Code: EI 593

COs	Statement
EI 593.1	Apply formulate transfer function for given control system problems.
EI 593.2	Demonstrate an understanding of the fundamentals of control systems.
EI 593.3	Determine time response of given control system model.
EI 593.4	Analyze the system behavior through Root Locus, Bode plots & Nyquist plot for a given control system model.

Paper Name: DIGITAL SIGNAL PROCESSING LAB
Paper Code: EI 594A

COs	Statement
EI594A.1	Analyze various signals in transform domain.
EI594A.2	Develop various DSP Algorithms using MATLAB functions .
EI594A.3	Enable students to analyze and design different signals using MATLAB
EI594A.4	Understand and verify the properties of DFTs/IDFT .

Paper Name: RF & MICROWAVE ENGINEERING LAB
Paper Code: EI 594B

COs	Statement
EI594B.1	Able to Define, identify and list out special type transmission line, its characteristics in microwave frequencies and concept of load.
EI594B.2	Able to recognize, memorize, categorize, arrange and implement suitably the variousmicrowave passive devices with the utilization of engineering mathematics.
EI594B.3	Able to analyse and use the various sources of microwave energy and the characters of itsoperation.
EI594B.4	Able to use, compute, solve, demonstrate and apply various hardware, software tools andmeasuring instruments in the field of Radio Frequencies, for the betterment of communication engineering, medical science and various domestic and commercial engineering.

Paper Name: DESIGN AND DEVELOPMENT OF IOT BASED INSTRUMENTATION SYSTEM
Paper Code: MC581

COs	Statement
MC581.1	Able to understand the building blocks of IoT technology
MC581.2	Able to understand the application areas of IOT ·
MC581.3	Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks.
MC581.4	Able to use processors & peripherals to design & build IoT hardware.

CO-PO/PSO mapping

Paper Name: INDUSTRIAL INSTRUMENTATION
Paper Code: EI501

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
EI501.1	3	2	3	-	-	-	3	-	-	-	1	2
EI501.2	-	-	1	-	-	-	-	-	-	-	-	-
EI501.3	2	-	2	-	1	-	**2**	-	-	-	-	-
EI501.4	-	-	2	-	-	**2**	**2**	-	-	-	-	-

Paper Name: ANALOG & DIGITAL COMMUNICATION THEORY
Paper Code: EI502

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2
EI502.1	-	-	2	-	-	-	-	-	-	-	-	-	3	3
EI502.2	1	-	1	3	-	-	-	-	-	-	-	-	3	2
EI502.3	-	2	-	-	-	-	-	-	-	-	-	-	2	3
EI502.4	1	-	-	3	-	-	-	-	-	-	-	-	3	3

Paper Name: CONTROL ENGINEERING
Paper Code: EI 503

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2
EI503.1	3	2	-	-	1	-	-	-	-	-	-	-	2	3
EI503.2	1	2	-	3	-	-	-	-	-	-	-	-	2	2
EI503.3	1	-	2	-	-	-	-	-	-	-	-	-	2	2
EI503.4	2	3	-	-	-	-	-	-	-	-	-	-	3	3
EI503.5	3	-	1	2	-	-	-	-	-	-	-	-	PSO1	PSO2

Paper Name: DIGITAL SIGNAL PROCESSING
Paper Code: EI 504A

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EI 504A.1	3	3	1	1	1	1	1	1	1	1	1	1	1	3
EI 504A.2	3	3	1	2	1	1	1	1	1	1	1	1	1	3
EI 504A.3	3	3	1	3	3	3	1	1	1	1	1	1	2	3
EI 504A.4	3	3	3	3	1	2	1	1	1	1	1	1	3	3
EI 504A.5	3	3	3	3	3	1	1	1	1	1	1	1	3	3
EI 504A.6	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Paper Name: RF & MICROWAVE ENGINEERING
Paper Code: EI 504B

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EI504B.1	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	2	2
EI504B.2	**1**	**-**	**1**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	2	3
EI504B.3	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	2	3
EI504B.4	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	3	2

Paper Name: DESIGN AND DEVELOPMENT OF IOT BASED INSTRUMENTATIONSYSTEM
Paper Code: MC581

CO Vs PO, PSO MAPPING FOR MC581															
COs for Course C3	**Statement**	**PO1**	**PO2**	**PO3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**P O 1 1**	**P O 12**	**P S O 1**	**PS O 2**
MC581 : 1	The students have ability to understand the building blocks of IoT technology	2	2	2	2	2	1	1	1	1	1	1	1	2	2
MC581 : 2	The students have ability to understand the application areas of IOT	2	3	3	1	2	2	2	1	1	2	1	2	1	2
MC581 : 3	The students have ability to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks.	3	3	1	3	3	2	1	1	1	2	1	2	2	2
MC581 : 4	The students have ability to use processors & peripherals to design & build IoT hardware	3	3	2	3	3	2	1	1	1	1	1	1	2	2

B. Tech Sixth Semester Curriculum

A.THEORY								
Sl no	Field	Code	Subjects	Contact hours/week				Credit points
				L	T	P	Total	
1	PC	EI 601	Process Control-I	3	0	0	3	3
2	PC	EI 602	Bio Medical Instrumentation	3	0	0	3	3
3	PE	EI 603A / EI 603B/ EI 603C	Power Electronics / Industrial Drives/ Advanced Sensors	3	0	0	3	3
4	PE	EI604A / EI 604B	Optoelectronics & Fibre Optic Sensors/ Soft Computing	3	0	0	3	3
5	OE	CS(EI)615A / CS(EI)615B/ CS(EI)615C	Data Structures & Algorithms / Database Management System /Software Engineering	3	0	0	3	3
Total Theory							15	15

B.PRACTICAL								
Sl no	Field	Code	Subjects	Contact hours/week				Credit Points
				L	T	P	Total	
6	PC	EI 691	Process Control Lab	0	0	3	3	2
7	PE	EI 693A/ EI 693B/EI 693C	Power Electronics Lab / Industrial Drives Lab/ Advanced Sensors Lab	0	0	3	3	2
8	OE	CS(EI)685A / CS(EI)685B/ CS(EI)685C	Data Structures & Algorithms Lab/Database Management System Lab / Software Engineering Lab	0	0	3	3	2

C.SESSIONAL								
	Field	Code	Subjects	Contact hours/week				Credit Points
				L	T	P	Total	
9	PW	EI 681	GD & Seminar	0	0	3	3	3
10	PW	EI 682	Mini Project	0	0	3	3	3
Total practical							15	12
Total 6th semester							30	27

Paper Name: PROCESS CONTROL-1
Paper Code: EI601

COs	Statement
EI 601.1	Design a controller by applying the knowledge of different control action.
EI 601.2	Calculate controller parameters by applying different tuning methods.
EI 601.3	Describe different advanced control strategy.
EI 601.4	State the operation and use of final control element.
EI 601.5	Develop ladder logic programs and understand basics of DCS.

Paper Name: BIOMEDICAL INSTRUMENTATION
Paper Code: EI602

COs	Statement
EI602.1	Able to understand the detailed physiology of various human anatomical systems.
EI602.2	Able to identify proper transducer for acquisition of a particular bioelectric potential.
EI602.3	Able to measure various bioelectric potentials.
EI602.4	Able to analyse various biological conditions from the measured bioelectric potentials.
EI602.5	Able to design biotelemetry systems for acquiring bioelectric potentials from long distance.

Paper Name: POWER ELECTRONICS
Paper Code: EI 603A

COs	Statement
EI603A.1	Acquire knowledge about fundamental concepts and techniques used in power electronics.
EI603A.2	Ability to express characteristics of SCR, BJT, MOSFET and IGBT.
EI603A.3	Express the design and control of rectifiers, inverters.
EI603A.4	Ability to analyze various single phase and three phase power converter circuits and understand their applications.
EI603A.5	To develop skills to build, and troubleshoot power electronics circuits like SMPS, Intelligent power module, etc's.

Paper Name: INDUSTRIAL DRIVES
Paper Code: EI 603B

COs	Statement
EI603B.1	Demonstrate the basic requirements of dc drive and ac drive.
EI603B.2	Illustrate the principles of speed-control of dc motors and ac motors.
EI603B.3	Classify the industrial applications of dc drive and ac drive.

Paper Name: OPTOELECTRONICS AND FIBRE OPTIC SENSORS
Paper Code: EI 604A

COs	Statement
EI604A.1	Compare LED and semiconductor LASER based on working principle and applications.
EI604A.2	Compare p-n photodiode, p-i-n photodiode, avalanche photodiode, photo transistor and photomultiplier tube based on responsivity, efficiency, and working principle.
EI604A.3	Explain working principle of single mode and multimode optical fibers.
EI604A.4	Select a suitable optical fiber for an engineering application, based on number of modes required, distance to be covered and V-parameter.
EI604A.5	Justify the selection of fiber optic sensors for measuring temperature, pressure, liquid level, displacement and angle of rotation.

Paper Name: **SOFT COMPUTING**
Paper Code: **EI 604B**

COs	Statement
EI604B.1	Use fuzzy logic for decision making in presence of uncertainty.
EI604B.2	Design a fuzzy logic control system for a continuous-time plant with single i/p-single o/p.
EI604B.3	Compare the different types of artificial neural networks, based on supervised and unsupervised learning techniques.
EI604B.4	Justify the application of genetic algorithm based optimization technique in a situation with large number of possible solutions.

Paper Name: **DATA STRUCTURES AND ALGORITHMS**
Paper Code: **CS(EI) 615A**

COs	Statement
CS(EI) 615A.1	Understand the concept of abstract data types and algorithms.
CS(EI) 615A.2	Understand linear data structures such as arrays, linked lists, stacks and queues.
CS(EI) 615A.3	Understand non-linear data structures such as tree, graph.
CS(EI) 615A.4	Apply different data structures in building applications.

Paper Name: **DATABASE MANAGEMENT SYSTEM**
Paper Code: **CS(EI)615B**

COs	Statement
CS(EI) 615B.1	To identify, formulate, and solve software engineering problems, including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements
CS(EI) 615B.2	To analyze, elicit and specify software requirements through a productive working relationship with various stakeholders of the project
CS(EI) 615B.3	To design applicable solutions in one or more application domains using software engineering approaches that integrates ethical, social, legal and economic concerns.
CS(EI) 615B.4	To develop the code from the design and effectively apply relevant standards andperform testing, and quality management and practice.
CS(EI) 615B.5	To identify modern engineering tools necessary for software project management, time management and software reuse, and an ability to engage in life-long learning.

Course Name: PROCESS CONTROL LAB
Course Code: EI691

COs	Statement
EI691.1	Recognize & explain basic process control loop elements via hands on experiment.
EI691.2	Control different process variable (flow, pressure, level & temperature) using different controllermode.
EI691.3	Use various PLC functions and develop PLC programs to control a real time system.
EI691.4	Control & monitor different process variable through DCS.

Paper Name: POWER ELECTRONICS LABORATORY
Code: EI 693A

COs	Statement
EI 693A .1	Identify relevant information to supplement to the Power Electronics (EE603)course.
EI 693A .2	Set up testing strategies and select proper instruments to evaluate performance characteristics of Power devices and power electronics circuits and analyze their operation under different loading conditions.
EI 693A .3	Realize the limitations of computer simulations for verification of circuit behavior, apply these techniques to different power electronic circuits and evaluate possible causes of discrepancy in practical experimental observations in comparison to theory.
EI 693A .4	Prepare professional quality textual and graphical presentations of laboratory data and computational results, incorporating accepted data analysis and synthesis methods, mathematical software,and word-processing tools.
EI 693A .5	Primarily via team-base laboratory activities, students will demonstrate the ability to interacteffectively on a social and interpersonal level with fellow students, and will demonstrate the ability to divide up and share task responsibilities to complete assignments.

Paper Name: INDUSTRIAL DRIVES LABORATORY
Code: EI693B

COs	Statement
EI 693B.1	Test DC and AC motor drive.
EI 693B.2	Perform tests on transformers.

Paper Name: DATA STRUCTURES & ALGORITHMS LAB
Code: CS(EI) 685A

COs	Statement
CS(EI) 685A.1	Ability to identify the appropriate data structure for given problem.
CS(EI) 685A.2	Graduate able to design and analyze the time and space complexity of algorithm orprogram.
CS(EI) 685A.3	Ability to effectively use compilers includes library functions, debuggers and troubleshooting.

Paper Name: DATABASE MANAGEMENT SYSTEM LAB
Code: CS(EI)685B

COs	Statement
CS(EI)685B.1	Understand the basic concepts regarding database, know about query processing and techniques involved in query optimization and understand the concepts of database transaction and related database facilities including concurrency control, backup and recovery.
CS(EI)685B.2	Understand the introductory concepts of some advanced topics in data management like distributed databases, data warehousing, deductive databases and be aware of some advanced databaseslike partial multimedia and mobile databases.
CS(EI)685B.3	Differentiate between DBMS and advanced DBMS and use of advanced databaseconcepts and become proficient in creating database queries.
CS(EI)685B.4	Analyze database system concepts and apply normalization to the database.
CS(EI)685B.5	Apply and create different transaction processing and concurrency control applications.

CO-PO/PSO mapping

Paper Name: PROCESS CONTROL-1
Paper Code: EI601

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2
EI 601.1	3	2	2	**1**	**2**	**-**	1	**-**	**1**	**-**	2	2	2	1
EI 601.2	**3**	**2**	1	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	2	1	2
EI 601.3	2	1	1	**-**	1	**-**	**1**	**1**	**-**	**-**	**2**	-	1	1
EI 601.4	1	1	-	**-**	-	**-**	**-**	**-**	**-**	**-**	**1**	-	1	1
EI 601.5	3	-	3	**2**	1	**-**	**-**	**-**	**-**	**-**	**2**	2	2	2

Paper Name: BIOMEDICAL INSTRUMENTATION
Paper Code: EI602

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2
EI602.1	**3**	**2**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**2**
EI602.2	**3**	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**2**
EI602.3	**3**	**3**	**2**	**3**	**3**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**3**
EI602.4	**3**	**3**	**2**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**
EI602.5	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**-**	**-**	**-**	**-**	**2**	**2**	**3**

Paper Name: Power Electronics
Paper Code: EI 603A

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
EI603A.1	3	2	2	1	1	-	-	-	-	-	2	1
EI603A.2	1	2	3	-	2	-	-	-	-	-	-	-
EI603A.3	2	-	2	-	1	-	-	-	-	-	-	-
EI603A.4	-	1	-	-	3	1	-	-	-	-	-	-
EI603A.5	-	-	-	-	-	-	1	2	-	-	-	-

Paper Name: INDUSTRIAL DRIVES
Paper Code: EI 603B

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
EI603B.1	3	1	-	-	2	-	-	-	-	-	-	2
EI603B.2	3	2	2	-	3	-	-	-	-	-	-	2
EI603B.3	3	-	-	1	2	2	-	-	-	-	1	2

Paper Name: OPTOELECTRONICS AND FIBRE OPTIC SENSORS
Paper Code: EI 604A

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
EI604A. 1	3	-	3	-	-	-	-	-	-	-	2	-
EI604A.2	3	-	3	-	-	-	-	-	-	-	2	-
EI604A.3	3	-	-	-	-	-	2	-	-	-	-	2
EI604A.4	3	-	2	-	3	-	2	-	-	-	-	-
EI604A.5	3	-	3	-	3	-	-	-	-	-	**2**	2

Paper Name: SOFT COMPUTING
Paper Code: EI 604B

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
EI604B. 1	3	-	2	-	-	-	-	-	-	-	-	2
EI604B.2	3	-	3	-	3	-	-	-	-	-	-	2
EI604B.3	3	-	1	**2**	-	-	-	-	-	-	-	2
EI604B.4	3	-	1	**2**	-	-	-	-	-	-	-	2

Paper Name: DATA STRUCTURES AND ALGORITHMS
Paper Code: CS(EI) 615A

CO	PO1	PO2	POP3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CS(EI)615A.11	3	3	2	2	3	2	2	3	3	3	2	3
CS(EI)615A.2	3	2	2	2	2	2	3	2	2	3	3	2
CS(EI)615A.3	3	3	3	2	3	3	3	2	2	3	3	2
CS(EI)615A.4	3	3	3	3	3	3	3	3	3	3	3	3

Course Name: DATABASE MANAGEMENT SYSTEM
Course Code: CS(EI)615B

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CS(EI) 615B.1	1	1	2	2	1	-	-	-	-	-	-	-
CS(EI) 615B.2	2	2	1	-	-	-	-	-	-	-	-	-
CS(EI) 615B.3	-	-	-	-	-	2	-	1	-	1	-	-
CS(EI) 615B.4	-	-	-	-	-	-	-	-	-	2	-	-
CS(EI) 615B.5	-	-	-	-	-	-	-	-	3	-	1	2

Paper Name: PROCESS CONTROL LAB
Code: EI691

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
EI691.1	2	2	1	-	-	-	-	-	-	-	-	-
EI691.2	2	2	1	1	2	-	-	-	2	-	-	-
EI691.3	2	3	3	3	3	1	-	-	1	-	-	-
EI691.4	1	2	2	-	-	-	-	-	1	-	-	-

Course Name: POWER ELECTRONICS LABORATORY
Course Code: EI 693A

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
EI 693A .1	2	1	1	1	-	-	-	-	-	-	2	1
EI 693A .2	1	2	1	1	-	1	1	-	-	-	-	1
EI 693A .3	1	2	1	1	2	-	-	-	-	-	-	1
EI 693A .4	1	-	-	-	2	1	1	-	-	-	1	-
EI 693A .5	-	-	-	-	-	1	1	-	-	-	1	-

Paper Name: INDUSTRIAL DRIVES LABORATORY
Code: EI693B

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
EIE693B.1	3	3	2	-	2	-	-	-	-	-	2	2
EIE693B.2	3	3	2	-	1	-	-	-	-	-	3	2

Paper Name: DATA STRUCTURES & ALGORITHMS LAB
Code: CS(EI) 685A

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CS(EI) 685A.1	**3**	**2**	**2**	-	-	-	-	**2**	-	-	-	**1**
CS(EI) 685A.2	**3**	-	**3**	-	-	**2**	-	-	-	-	-	-
CS(EI) 685A.3	**3**	**3**	-	-	-	-	-	-	-	-	-	**1**

Paper Name: DATABASE MANAGEMENT SYSTEM LAB
Code: CS(EI)685B

CO	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PO1
CS(EI)685C.1	3	2	3	2	3	-	-	-	-	-	-	1
CS(EI)685C.2	2	2	3	-	-	-	-	-	-	-	-	1
CS(EI)685C.3	2	3	2	2	3	-	-	-	-	-	-	-
CS(EI)685C.4	3	2	-	-	-	-	-	-	-	-	-	-
CS(EI)685C.5	2	1	-	-	-	-	-	-	-	-	-	1

B.Tech Seventh Semester Curriculum

A.THEORY

Sl no	Field	Code	Subjects	Contact hours/week				Credit points
				L	T	P	Total	
1	HS	HU702	Values & Ethics in Profession	2	0	0	2	2
2	PC	EI 701	Telemetry and Remote Control	3	0	0	3	3
3	PC	EI 702	Process Control-II	3	0	0	3	3
4	PE	EI703A/ EI703B/ EI703C	Digital Image Processing/ Non-Conventional Energy Sources/Analytical Instrumentation	3	0	0	3	3
5	OE	CS(EI)714A / CS(EI)714B/ CS(EI)714C	Computer Networking/ Computer graphics and Multimedia/ Object Oriented Programming	3	0	0	3	3
Total Theory							14	14

B.PRACTICAL

Sl no	Field	Code	Subjects	Contact hours/week				Credit Points
				L	T	P	Total	
6	PC	EI 791	Process Control Lab	0	0	3	3	2
7	OE	CS(EI)784A / CS(EI)784B / CS(EI)784C	Computer Networking Lab/ Computer graphics and Multimedia Lab / Object Oriented Programming Lab	0	0	3	3	2
8	PW	EI 793	Project-1	0	0	6	6	2

C.SESSIONAL

	Field	Code	Subjects	Contact hours/week				Credit Points
				L	T	P	Total	
9	PW	EI 781	Industrial Training Evaluation	4 wks during 6th -7th Sem-break				2
10	MC	MC781	Foreign Language	2	0	5	MC	MC781
Total practical and sessional							14	8
Total 7th Semester							28	22

Paper Name: VALUES AND ETHICS IN PROFESSION
Paper Code: HU702

COs	Statement
HU 702.1	Understand the core values that shape the ethical behaviour of an engineer and Exposed awareness on professional ethics and human values.
HU 702.2	Understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories
HU 702.3	Understand various social issues, industrial standards, code of ethics and role of professional ethics in engineering field
HU 702.4	Aware of responsibilities of an engineer for safety and risk benefit analysis, professional rights and responsibilities of an engineer.
HU 702.5	Acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives

Paper Name: Telemetry & Remote Control
Paper Code: EI701

COs	Statement
EI 701.1	Identify the concepts and utilities of telemetry systems
EI 701.2	Describe utilities of modulation and multiplexing processes in telemetry systems and their technicalities
EI 701.3	Design of various telemetry systems and identification of applications.
EI 701.4	Identify the need of remote control and various methods in existence
EI 701.5	Design guidelines for solving different industry related complex problems

Paper Name: PROCESS CONTROL-II
Paper Code: EI 702

COs	Statement
EI702.1	Carry out the discretization and reconstruction of a given signal by using ideal sampler and zero order hold, respectively
EI702.2	Carry out z-transform and inverse z-transform for given functions
EI702.3	Carry out mathematical modeling, stability analysis and time response analysis of a linear time-invariant discrete-time control system
EI702.4	Design digital PID controller and deadbeat controller for linear time-invariant single i/p-single o/psystem.
EI702.5	Explain the functionality of DCS in a process plant, including control, communication, protocolsand network topology
EI702.6	Compare the fuzzy logic control system with a conventional control system

Paper Name: DIGITAL IMAGE PROCESSING
Paper Code: EI 703A

COs	Statement
EI703A.1	Understand image formation and the role human visual system plays in perception of gray and color image data.
EI703A.2	Get broad exposure to and understanding of various applications of image processing inindustry, medicine, and defense.
EI703A.3	Learn the signal processing algorithms and techniques in image enhancement and image restoration.
EI703A.4	Acquire an appreciation for the image processing issues and techniques and be able to applythese techniques to real world problems.
EI703A.5	Be able to conduct independent study and analysis of image processing problems andtechniques.

Paper Name: NON-CONVENTIONAL ENERGY SOURCES
Paper Code: EI703B

COs	Statement
EI703B.1	Gain knowledge of different nonrenewable sources.
EI703B.2	Realize solar energy applications using photo voltaic cells.
EI703B.3	Analyses the performance and testing of different energy resources.
EI703B.4	Select the design parameters of the nonconventional energy plants.

Paper Name: COMPUTER NETWORKING
Paper Code: CS(EI)714A

COs	Statement
CS(EI)714A .1	Understand OSI and TCP/IP models.
CS(EI)714A .2	Analyze MAC layer protocols and LAN technologies.
CS(EI)714A .3	Design applications using internet protocols.
CS(EI)714A .4	Implement routing and congestion control algorithms.
CS(EI)714A .5	Develop application layer protocols and understand socket programming

Paper Name: OBJECT ORIENTED PROGRAMMING
Paper Code: CS(EI)714C

COs	Statement
CS(EI)714C.1	Design the process of interaction between Objects, classes & methods w.r.t. Object Oriented Programming using java.
CS(EI)714C.2	Acquire a basic knowledge of Object Orientation with different properties as well as different features of Java.
CS(EI)714C.3	Analyze various activities of different string handling functions with various I/Ooperations.
CS(EI)714C.4	Discuss basic Code Reusability concept w.r.t. Inheritance, Package and Interface.
CS(EI)714C.5	Implement Exception handling, Multithreading and Applet (Web program in java) programming concept in Java.

Paper Name: TELEMETRY AND REMOTE CONTROL LAB
Paper Code: EI 791

COs	Statement
EI 791.1	Recognize and explain basic computational properties of remote sensing data acquisition, storage, and processing.
EI 791.2	Apply mathematical relationships describing fundamental physical, geometric, and computational principles relevant to remote sensing.
EI 791.3	Recognize and explain at a basic level fundamental physical principle of remote sensing.
EI 791.4	Explain EM radiation interactions vary across a limited number of substances, geometries, andtemperatures; and geometric properties of photographs and images.
EI 791.5	Demonstrate proficiency and conceptual understanding in using software or manual techniquesto carry out remote sensing image processing and analysis through a series of laboratory exercises and reports.

Paper Name: COMPUTER NETWORKING LAB
Paper Code: CS(EI)784A

COs	Statement
CS(EI)784A .1	Demonstrate the socket program using TCP & UDP.
CS(EI)784A .2	Develop simple applications using TCP & UDP.
CS(EI)784A .3	Develop the code for Data link layer protocol simulation.
CS(EI)784A .4	Examine the performances of Routing protocol.
CS(EI)784A 5	Experiment with congestion control algorithm using network simulator

Paper Name: Object Oriented Programming Lab
Paper Code: CS(EI)784C

COs	Statement
CS(EI)784C .1	Implement the process of object orientation in java with the help of Class-object-Constructor relationship in Object Oriented Programming
CS(EI)784C.2	Implement basic knowledge of code reusability with the help of Java in Object Oriented Programming.
CS(EI)784C.3	Analyze the significance of various keywords w.r.t Encapsulation and polymorphism technique in OOPs.Implements exception handling in Java.
CS(EI)784C.4	Discuss basic Data abstraction concept w.r.t. Inheritance, Package and Interface
CS(EI)784C.5	Implement Exception handling, Multithreading and Applet (Web program in java) programming concept in Java

Paper Name: FOREIGN LANGUAGE
Paper Code: MC781

COs	Statement
MC781.1	Read basic French and interpret the meaning
MC781.2	Construct simple sentences in French
MC781.3	Interact with others and hold simple conversations in French

CO-PO/PSO mapping

Paper Name: Value and Ethics in Profession
Paper Code: HU 702

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
HU702.1	_	_	_	_	_	1	1	1	1	2	_	_
HU702.2	_	_	_	_	_	1	1	3	1	2	_	_
HU702.3	_	_	_	_	_	3	2	3	_	1	_	_
HU702.4	_	_	_	_	_	3	2	1	_	_	_	_
HU702.5	_	_	_	_	_	3	2	2	_	1	3	_

Paper Name: Telemetry & Remote Control
Paper Code: EI701

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2
EI 701.1	1	-	2	-	-	-	-	-	-	-	-	-	3	3
EI 701.2	1	-	1	3	-	-	-	-	-	-	-	-	3	2
EI 701.3	-	2	-	-	-	-	-	-	-	-	-	-	2	3
EI 701.4	1	-	-	3	-	-	-	-	-	-	-	-	3	3
EI 701.5	1	2	-	3	-	-	-	-	-	-	-	-	3	2

Paper Name: PROCESS CONTROL-II
Paper Code: EI 702

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
EI702. 1	3	-	3	-	1	-	-	-	-	-	-	-
EI702.2	3	-	3	-		-	-	-	-	-	-	-
EI702.3	3	-	3	-	3	-	-	-	-	-	-	-
EI702.4	3	-	3	-	3	-	-	-	-	-	-	-
EI702.5	3	-	3	-	3	-	-	-	2	-	-	2
EI702.6	3	-	1	-	3	-	-	-	-	-	-	2

Paper Name: DIGITAL IMAGE PROCESSING
Paper Code: EI 703A

COs for Course	PO1	PO2	PO3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	P O 1 1	P O 12	P S O 1	PS O2
EI703A.1	1	2	3	2	1	0	3	1	2	2	1	1	2	2
EI703A.2	2	2	1	1	1	0	1	0	2	3	3	2	1	3
EI703A.3	2	2	1	1	0	1	2	1	1	2	3	3	2	3
EI703A.4	2	2	1	3	0	1	3	1	2	2	3	3	2	2

Paper Name: NON-CONVENTIONAL ENERGY SOURCES
Paper Code: EI703B

	PO1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
EI703B.1	3	-	3	**2**	**-**	**2**	1	**-**	**-**	**-**	1	1
EI703B.2	**3**	**2**	1	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	-
EI703B.3	3	1	1	**-**	1	2	-	**1**	**-**	**-**	**-**	-
EI703B.4	1	2	2	**3**	2	1	**-**	**-**	**1**	**1**	**-**	2

Paper Name: COMPUTER NETWORKING
Paper Code: CS(EI)714A

CO	PO1	PO2	POP3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CS(EI)714A.1	-	2	-	2	-	-	-	-	2	-	-	-
CS(EI)714A.2	-	2	-	-	-	-	-	-	2	-	-	-
CS(EI)714A.3	2	2	-	-	2	-	-	-	2	-	-	-
CS(EI)714A.4	2	2	-	-	2	2	-	-	2	-	-	-
CS(EI)714A.5	3	3	-	-	3	-	-	-	2	-	-	-

Paper Name: **OBJECT ORIENTED PROGRAMMING**
Paper Code: **CS(EI)714C**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CS(EI)714C.1	3	3	2	-	-	-	-	-	-	-	-	-
CS(EI)714C.2	3	2	-	-	-	-	-	-	-	-	-	-
CS(EI)714C.3	3	3	3	-	-	-	2	-	2	-	-	-
CS(EI)714C.4	-	-	2	-	-	-	-	-	-	-	-	-
CS(EI)714C.5	-	-	-	-	2	-	-	-	2	2	2	-

Paper Name: **TELEMETRY AND REMOTE CONTROL LAB**
Paper Code: **EI 791**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
EI 791.1	3	2	2	1	1	-	-	-	-	-	1	-
EI 791.2	3	2	1	-	1	-	-	-	-	-	1	-
EI 791.3	3	3	3	1	-	-	-	-	-	-	1	-
EI 791.4	2	2	2	1	-	-	-	-	-	-	-	-
EI 791.5	2	2	2	-	2	-	-	-	-	-	1	-

Paper Name: COMPUTER NETWORKING LAB
Paper Code: CS(EI)784A

CO	PO1	PO2	POP3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CS(EI)784A.1	3	3	3	2	3	2	1	-	3	2	2	3
CS(EI)784A.2	3	3	3	2	3	3	2	3	3	2	2	3
CS(EI)784A.3	3	3	3	2	2	1	2	1	3	2	2	3
CS(EI)784A.4	3	3	3	1	2	2	1	3	3	2	2	3
CS(EI)784A.5	3	3	3	2	2	2	1	2	3	2	2	3

Paper Name: Object Oriented Programming Lab
Paper Code: CS(EI)784C

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CS(EI)784C .1	**3**	-	**2**	-	-	-	-	-	-	-	-	-
CS(EI)784C.2	**3**	**2**	**2**	-	-	-	-	-	-	-	-	-
CS(EI)784C.3	-	**3**	**3**	**3**	-	-	**2**	-	-	-	-	-
CS(EI)784C.4	**3**	**3**	**2**	-	-	-	-	-	-	-	-	-
CS(EI)784C.5	-	-	**3**	-	**2**	-	-	-	**2**	**2**	-	-

Paper Name: FOREIGN LANGUAGE
Paper Code: MC781

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
MC781.1	2	-	-	3	-	3	2	2	3	3	-	**3**
MC781.2	2	3	3	3	-	3	3	3	2	3	-	3
MC781.3	1	3	3	3	-	2	2	2	2	3	-	2

B.Tech Eighth Semester Curriculum

A.THEORY								
Sl no	Field	Code	Subjects	Contact hours/week				Credit points
				L	T	P	Total	
1	HS	HU804	Industrial &Financial Management	2	0	0	2	2
2	PE	EI801A/ EI801B/	Plant Automation/ Embedded System Design/	3	0	0	3	3
3	PE	EC(EI) 802A/ EC(EI)802B/	Mobile Communication/ VLSI & Microelectronics/	3	0	0	3	3
Total Theory							8	8
B.PRACTICAL & SESSIONAL								
Sl no	Field	Code	Subjects	Contact hours/week				Credit Points
				L	T	P	Total	
4	PC	EI 891	Instrumentation & Control Lab	0	0	3	3	2
5	PW	EI 892	Project-2	0	0	12	12	6
6	PW	EI893	General Viva-voce					4
Total practical and sessional							15	12
Total 8th Semester							23	20

Paper Name: Industrial & Financial Management
Paper Code: HU804

COs	Statement
HU804.1	Explain and describe various technology-based business models and the dynamics of value creation, value proposition, and value capture in industrial enterprises.
HU804.2	Select, interpret and use different costing techniques as a basis for decisions in various business situations.
HU804.3	Understand the basic principles of financial accounting and reporting.
HU804.4	Produce and interpret an industrial company's Annual Statement, at a basic level.
HU804.5	Describe the operations of an industrial enterprise from various perspectives, and analyze itsbasic strengths and weaknesses based on concepts from the field of Industrial Management.
HU804.6	Explain how the industrial company markets and price it's products considering GST.

Paper Name: PLANT AUTOMATION
Paper Code: EI 801A

COs	Statement
EI801A.1	Understand the operational functions of PLC, DCS and SCADA.
EI801A.2	Analyze Industrial Networking, Networking protocols and topologies.
EI801A.3	Demonstrate the competence in maintaining and troubleshooting technology, detecting more serious problems, generating workable solutions to correct deviations and recognizing when to get additional help.
EI801A.4	Analyze the automation technologies in different types of plants.

Paper Name: EMBEDDED SYSTEM DESIGN
Paper Code: EI801B

COs	Statement
EI801B.1	Understand the architecture and classifications of embedded system and the relatedprogramming.
EI801B.2	Understand the concepts of embedded systems like IO, timers, interrupts, interaction with peripheral devices
EI801B.3	Choose case-specific debugging technique for an embedded system.
EI801B.4	Design various real time systems using embedded systems.

Paper Name: MOBILE COMMUNICATION
Paper Code: EI 802A

COs	Statement
EI802A.1	By the end of the course, the student will be able to analyze and design wireless and mobilecellular systems.
EI802A.2	By the end of the course, the student will have the ability to work in advanced research wirelessand mobile cellular programs.
EI802A.3	By the end of the course, the student will be able to realize all the applications of wireless protocols.
EI802A.4	By the end of the course, the student will be able to design the mobile networks.

Paper Name: MECHATRONICS
Paper Code: EC(EI)802C

COs	Statement
EC(EI)802C.1	Mechatronics graduate will be able to Employ the knowledge of mathematics, science, and engineering.
EC(EI)802C.2	Able to Design mechatronics component, system or process to meet desired needs.
EC(EI)802C.3	Define and solve engineering problems.
EC(EI)802C.4	Use the techniques, skills, and modern mechatronics engineering tools necessary for engineering practice.
EC(EI)802C.5	Identify and evaluate ethical ramifications and professional responsibilities in a variety ofsituations.
EC(EI)802C.6	Discuss the impact of engineering on society, safety, and environment in relation tocontemporary issues.

Paper Name: INSTRUMENTATION & CONTROL DESIGN LABORATORY
Paper Code: EI 891

COs	Statement
EI 891.1	Understand and analyze Instrumentation systems and their applications.
EI 891.2	Demonstrate the procedure to design an instrument and system that meets desired specifications and requirements.
EI 891.3	Apply the knowledge of signal conditioning to practical engineering problems.
EI 891.4	Design a real control loop using the knowledge of Instrumentation and control.

CO-PO/PSO mapping

Paper Name: Industrial & Financial Management
Paper Code: HU804

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
HU804.1	-	1	1	2	-	2	-	-	-	-	-	-
HU804.2	-	-	-	-	3	1	2	-	-	-	1	-
HU804.3	3	-	-	-	-	2	-	-	-	-	3	-
HU804.4	-	2	-	-	1	-	1	-	-	-	-	-
HU804.5	-	3	-	2	-	-	-	-	-	-	-	-
HU804.6	-	2	2	3	-	-	-	-	-	-	2	-

Paper Name: PLANT AUTOMATION
Paper Code: EI 801A

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2
EI 801A.1	3	3	1	0	3	0	0	0	0	0	0	0	3	2
EI 801A.2	2	2	0	0	0	1	0	0	0	0	0	0	1	1
EI 801A.3	2	1	1	1	0	2	0	0	0	0	0	0	3	1
EI 801A.4	2	1	0	0	1	0	1	0	0	0	0	0	1	2

Paper Name: **EMBEDDED SYSTEM DESIGN**
Paper Code: **EI801B**

COs for Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO 2
EI801B.1	3	-	2	1	2	-	-	-	-	-	-	-	1	1
EI801B.2	2	1	3	1	-	-	-	-	-	-	-	-	2	-
EI801B.3	2	2	3	1	-	-	-	-	-	-	-	-	1	2
EI801B.4	3	2	2	-	-	-	-	-	-	-	-	-	1	2

Paper Name: **MOBILE COMMUNICATION**
Paper Code: **EI 802A**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO 2
EI802A.1	1	2	1	2	1	3	3	1	2	2	1	1	3	2
EI802A.2	2	2	1	1	3	0	1	0	2	3	3	2	1	3
EI802A.3	2	2	1	2	0	1	2	1	3	2	3	3	2	1
EI802A.4	2	2	1	3	0	1	3	2	2	2	3	3	2	3

Paper Name: **MECHATRONICS**
Paper Code: **EC(EI)802C**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
EC(EI)802C.1	3	2	2	1	1	-	-	-		-	2	1
EC(EI)802C.2	1	2	3	-	2	-	-	-	-	-	-	-
EC(EI)802C.3	2	-	2	-	1							
EC(EI)802C.4	-	1	-	-	3	1	-	-	-	-	-	-
EC(EI)802C.5	-	-	-	-	-	-	1	2	-	-	-	-
EC(EI)802C.6	-	-	-	-	-	-	1	3	2	-	-	-

Paper Name: **INSTRUMENTATION & CONTROL DESIGN LABORATORY**
Paper Code: **EI 891**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
EI 891.1	3	2	2	1	1	2	-	-		-	2	1
EI 891.2	1	2	3	2	2	-	-	-	-	-	1	-
EI 891.3	2	3	2	2	1	1					1	1
EI 891.4	3	1	3	1	3	1	-	-	-	-	1	2

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