R-16

CURRICULUM ESSENTIALS

Handbook on Outcome Based Education

ELECTRICAL ENGINEERING

NARULA INSTITUTE OF TECHNOLOGY

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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 upgradation 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 disseminate quality education in Electrical Technology and prepare capable engineers with ethical and multidisciplinary knowledge for the service of the society.

Department Mission

DM1: To impart comprehensive and quality education through intensive and continuous improvement and to develop innovative entrepreneur and ethical professionals, suitable for a sustainable environment.

DM2: To develop a reservoir of knowledge and experience and to intensify the faculty development program through interaction with the stake holders in education for mutual enrichment.

DM3: To promote, product oriented and dedicated research for establishing a self-sustaining and wealth-creating centre to serve, the social needs.

DM4: To prepare the students for new challenges in the field of electrical engineering.

DM5: To create and sustain an environment for critical thinking and problem solving.

DM6: To maintain intensive interaction with Industry and leading Research Centres, where students can be engaged in Projects, Training and Internships and to contribute vigorously in research and industrial development.

DM7: To undertake collaborative projects which offer opportunities for long-term interaction with academia and industry.

DM8: To develop human potential to its fullest extent so that intellectually capable and imaginatively gifted leaders can emerge in a range of professions.

Program Educational Objectives (PEOs)

B.Tech. in Electrical Engineering

PEO1. Graduates will be able to pursue knowledge and skills in the emerging areas of Electrical Engineering.

PEO2. Graduates will be able to test, verify and analyze the characteristics of various electrical apparatus.

PEO3. Graduates will be able to solve real world problem through intensive practice on industry-oriented projects and extending value addition to the society.

PEO4. Graduates will be able to become successful professionals and can pursue their career in the Government/Private sector, higher education, research and successful entrepreneurs.

PEO5. Graduates will be able to develop teamwork and leadership skills in different cultural and interdisciplinary backgrounds.

Program Specific Outcomes (PSOs)

B.Tech. in Electrical Engineering

PSO1. Use engineering knowledge to model and analyse the components of electrical power systems.

PSO2. Apply the knowledge of science and engineering to develop sustainable electrical systems for social and industrial need.

Program outcomes (POs)

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** 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.

11. **Project management and finance:** Demonstrate knowledge and understanding of the 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.

12. **Life-long learning:** 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.

Curriculum Structure

DEPARTMENT OF ELECTRICAL 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**					**Credit Points**
			L	**T**	**P**	**Total**	
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	PSO1	PSO2
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

A. THEORY							
Sl. No.	**Paper Code**	**Course Name**	**Contact Hours/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
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	DetermineandrecalltheпropertiesandformularelatedtoOrdinarydifferentialequations, Basic Graph Theory and Laplace transform.
M 201.2	DeterminethesolutionsoftheproblemsrelatedtoOrdinarydifferentialequations, Basic Graph Theory and Laplace transform.
M 201.3	ApplyappropriatemathematicaltoolsofOrdinarydifferentialequations, Basic Graph Theory and Laplace transform.
M201.4	Analyze engineering problems on Ordinary differential equations, Basic Graph Theory and Laplace transform.
M201.5	ApplyengineeringsolutionsbyusingOrdinarydifferentialequations,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.	**Paper Code**	**Course Name**	**Contact Hours/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	M 301	Mathematics – III	3	1	0	4	4
2	EC(EE) 301	Digital Electronics	3	1	0	4	3
3	EC(EE) 302	Analog Electronic Circuits	3	0	0	3	3
4	EE 301	Circuits Theory and Networks	3	1	0	4	4
5	EE 302	Field Theory	3	0	0	3	3
6	ME(EE) 301	Thermal Power Engineering	2	0	0	2	2
Total of Theory						**20**	**19**
B. PRACTICAL							
7	EC(EE) 391	Analog and Digital Electronics Laboratory	0	0	3	3	2
8	EE 391	Circuit Theory and Network Laboratory	0	0	3	3	2
9	ME(EE) 391	Thermal Power Engineering Laboratory	0	0	2	2	1
10	HU 381	Technical Report Writing and Language Practice	0	0	2	2	1
Total of Practical						**10**	**06**
Total of Theory and Practical						**30**	**25**

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: Digital Electronics
Paper Code: EC(EE) 301

COs	Statement
EC(EE) 301.1	Acquired knowledge about solving problems related to number systems conversions and Boolean algebra and design logic circuits using logic gates to their simplest forms using De Morgan's Theorems; Karnaugh Maps.
EC(EE) 301.2	Design of combinational circuits
EC(EE) 301.3	Design of various synchronous and asynchronous sequential circuits using State Diagrams & Tables.
EC(EE) 301.4	Understand DAC & ADC technique and corresponding circuits
EC(EE) 301.5	Analyze logic family interfaces, switching circuits & memory storage devices to Plan and execute projects.

Paper Name: Analog Electronic Circuits
Paper Code: EC(EE) 302

COs	Statement
EC(EE) 302.1	Students will be able to design D.C power supplies.
EC(EE) 302.2	Students will be able to analyze transistor amplifier circuit.
EC(EE) 302.3	Students will be able to understand effects of different feedback mechanism in amplifier circuit.
EC(EE) 302.4	Students will be able to analyze signal generator Circuit.
EC(EE) 302.5	Student will be able to design power amplifier circuit.
EC(EE) 302.6	Students will be able to understand linear and nonlinear applications of OPAMP (I.C-741).

Paper Name: Circuit Theory and Network
Paper Code: EE301

COs	Statement
EE 301.1	Know the basic concepts of electric & magnetic circuits and define associated terms
EE 301.2	Know operation of different OP-amp based filters
EE 301.3	Understand and analysis transient and steady-state response of any electrical circuit/network by applying different circuit analysis methods.

Paper Name: Field Theory
Paper Code: EE 302

COs	Statement
EE 302.1	Know the orthogonal co-ordinates & their transformation to solve & analyze problems on vector calculus.
EE 302.2	Know the basic laws of electrostatics and electromagnetism and define associated terms.
EE 302.3	Understand Maxwell's equation in different forms.
EE 302.4	Understand the propagation of EM waves associated with power system transmission line.

Paper Name: Thermal Power Engineering
Paper Code: ME(EE) 301

COs	Statement
ME(EE) 301.1	Get detailed knowledge on the working principle of mountings and accessories of fire tube and water tube boilers.
ME(EE) 301.2	Understand draught systems and carry out heat balance of a power plant to evaluate efficiency.
ME(EE) 301.3	Analyze the working of steam nozzles and variety of turbines to carry out design based project works and solution of industrial problems
ME(EE) 301.4	Evaluate the performance of I.C Engines and Gas turbines.

Paper Name: Analog and Digital Electronics Laboratory
Paper Code: EC(EE) 391

COs	Statement
EC(EE) 391.1	Able to understand the fundamental concepts and techniques used in digital electronics.
EC(EE) 391.2	Able to understand and examine the structure of various number systems, De-Morgan's law, Boolean algebra and its application in digital design.
EC(EE) 391.3	Able to understand, analyse the analog circuits pertaining to applications like amplifier, oscillators and timer.
EC(EE) 391.4	Able to know how to interface digital circuits with ADC & DAC.

Paper Name: Circuit Theory and Network Laboratory
Paper Code: EE391

COs	Statement
EE 391.1	Demonstrate transient analysis of electric circuits frequency response characteristics of Filter circuits
EE 391.2	Simulate electric circuits, signals, algorithms using software simulator

Paper Name: Thermal Power Engineering Laboratory
Paper Code: ME(EE) 391

COs	Statement
ME(EE) 391.1	Understand operations of different type of Boilers, their mountings and accessories.
ME(EE) 391.2	Evaluate the performance of a four stroke engine with varying load and speed.
ME(EE) 391.3	Carry out the heat balance of an I C Engine for design and development of solution.
ME(EE) 391.4	Determine calorific value of a fuel useful for future project works.

Paper Name: Technical Report Writing and Language Practice
Paper Code: HU 381

COs	Statement
HU 381.1	Understand and make use of a wide taxonomy of listening skills & sub-skills for comprehending& interpreting data in English
HU 381.2	Speak in English, using appropriate vocabulary and pronunciation in contextualized situations
HU 381.3	Understand and put into effective practice the pragmatics of Group Discussion
HU 381.4	Understand and write a detailed technical report as per organizational needs
HU 381.5	Understand and interact in professional presentations and interviews

CO-PO/PSO mapping

Paper Name: Mathematics – III
Paper Code: M 301

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
M 301.1	3	2	-	2	3	2	-	-	-	-	-	2	-	3
M 301.2	2	3	-	2	3	2	-	-	-	-	-	1	-	-
M 301.3	3	3	2	3	-	-	-	-	-	-	-	1	-	3

Paper Name: Digital Electronics
Paper Code: EC(EE) 301

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC(EE) 301.1	3	-		2		2	-	-	-	-	-	3	-	-
EC(EE) 301.2	2	-	3	2		2	-	-	-	-	-	-	3	3
EC(EE) 301.3	2	-	3			2	-	-	-	-	-	-	3	3
EC(EE) 301.4	3	2		3		2	-	-	-	-	-	-	-	-
EC(EE) 301.5	2	3		3	2		-	-	-	-	-	-	-	-

Paper Name: Analog Electronic Circuits
Paper Code: EC(EE) 302

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC(EE) 302.1	-	-	3	2	2	2	-	-	-	-	-	-	3	-
EC(EE) 302.2	-	3	-	2	2	2	-	-	-	-	-	-	-	-
EC(EE) 302.3	3	-	-	2	2	2	-	-	-	-	-	-	-	-
EC(EE) 302.4	-	3	-	2	2	2	-	-	-	-	-	-	-	-
EC(EE) 302.5	-	-	3	-	-	-	-	-	-	-	-	-	-	-
EC(EE) 302.6	3	-	-	-	-	-	-	-	-	-	-	-	3	-

Paper Name: Circuit Theory and Network
Paper Code: EE301

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 301.1	3	3	3	3		2	-	-	-	-	-	3	3	3
EE 301.2	3	3	3	3		2	-	-	-	-	-	3	3	3
EE 301.3	3	3	3	3		2	-	-	-	-	-	3	3	3

Paper Name: Field Theory
Paper Code: EE302

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 302.1	3	3	3	3	-	-	-	-	-	-	-	2	2	2
EE 302.2	3	3	3	3	-	2	-	-	-	-	-	2	2	2
EE 302.3	3	3	3	3	-	2	-	-	-	-	-	2	2	2
EE 302.4	3	3	3	3	-	-	-	-	-	-	-	2	2	2

Paper Name: Thermal Power Engineering
Paper Code: ME(EE) 301

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
ME(EE) 301.1	3	-	-	-	2	2	2	-	-	-	-	-	3	-
ME(EE) 301.2	3	-	-	-	2	2	2	-	-	-	-	-	-	3
ME(EE) 301.3	-	-	-	-	-	-	2	-	-	-	-	-	3	3
ME(EE) 301.4	-	-	3	-	-	-	-	-	-	-	-	-	-	-

Paper Name: Analog and Digital Electronics Laboratory
Paper Code: EC(EE) 391

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC(EE) 391.1	3	-	2		2	2	2	-	-	-	-	-	3	-
EC(EE) 391.2	3	-	2		2	2	2	-	-	-	-	-	3	-
EC(EE) 391.3	3	-	2		2	2	2	-	-	-	-	-	3	3
EC(EE) 391.4	3	-	2		2	2	2	-	-	-	-	-	-	-

Paper Name: Thermal Power Engineering Laboratory
Paper Code: ME(EE) 391

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
ME(EE) 391.1	3	-	-	3	3	2	2	-	-	-	-	-	-	-
ME(EE) 391.2	-	3		3	3	2	2	-	-	-	-	-	-	-
ME(EE) 391.3	-	-	3		3	2	2	-	-	-	-	-	3	-
ME(EE) 391.4	3	2			3	2	2							3

Name: Technical Report Writing and Language Practice
Paper Code: HU 381

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
HU 381.11	-	-	-	-	3	2	2	3	-	-	-	3	-	-
HU 381.2	-	-	-	-	3	2	2	3	-	-	-	3	-	-
HU 381.3	-	-	-	-	3	2	2	3	3	-	-	3	-	-
HU 381.4	-	-	-	-	3	2	2	3		3	-	3	-	-
HU 381.5	-	-	-	-	3	2	2	3		3	-	3	-	-

Paper Name: Circuit Theory and Network Laboratory
Paper Code: EE391

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 391.1	3	3	2	2	3	2	2	-	-	-	-	2	3	3
EE 391.2	3	3	2	2	3	2	2	-	-	-	-	2	3	3

B.Tech Fourth Semester Curriculum

A. THEORY							
Sl. No.	**Paper Code**	**Course Name**	**Contact Hours/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	PH(EE) 401	Physics – II	3	0	0	3	3
2	EE 401	Electrical Machines – I	3	1	0	4	4
3	EE 402	Electrical and Electronics Measurement	3	0	0	3	3
4	M(CS) 401	Numerical Methods	3	0	0	3	2
5	CS(EE) 402	Data Structure	3	0	0	3	2
Total of Theory						**16**	**14**
B. PRACTICAL							
6	PH(EE) 491	Physics – II Laboratory	0	0	3	3	2
7	EE 491	Electrical Machines – I Laboratory	0	0	3	3	2
8	EE 492	Electrical and Electronics Measurement Laboratory	0	0	3	3	2
9	M(CS) 491	Numerical Methods Laboratory	0	0	2	2	1
10	CS(EE) 492	Data Structure Laboratory	0	0	2	2	1
Total of Practical						**11**	**08**
C. SESSIONAL							
11	MC 481	Technical Skill Development	0	0	2	2	0
Total of Theory, Practical & Mandatory Activities / Courses						**27**	**22**

Note: Numerical Methods and Computer Programming Lab [CS(EE) 491], and Technical Report Writing and Language Laboratory Practice [HU(EE) 481] together, will be treated as one laboratory.

Paper Name: Physics – II
Paper Code: PH(EE) 401

COs	Statement
PH(EE) 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(EE) 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(EE) 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(EE) 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(EE) 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: Electrical Machines I
Paper Code: EE 401

COs	Statement
EE401.1	Know the Electromechanical Energy Conversion principle and concept of magnetic to understand the basic principles of electrical machine and define terms associated with rotating electrical machine.
EE401.2	Based on different type of requirement know the applications of d.c. machine, induction motor and transformer for a given application
EE401.3	Understand the principle of operation and know performance of d.c. machine, induction motor and transformer.

Paper Name: Electrical and Electronics Measurement
Paper Code: EE402

COs	Statement
EE402.1	Understand the basics of Electrical measuring system.
EE402.1	Study the measurement of Resistance, Inductance, Capacitance, Power, Energy, PF and Insulation resistance
EE 402.3	Study different measuring instruments.

Paper Name: Numerical Methods
Paper Code: M(CS) 401

COs	Statement
M(CS) 401.1	Recall the distinctive characteristics of various numerical techniques and the associated error measures.
M(CS) 401.2	Understand the theoretical workings of various numerical techniques and to solve the engineering problems.
M(CS) 401.3	Apply the principles of various numerical techniques to solve various problems.

Paper Name: Data Structure
Paper Code: CS(EE) 402

COs	Statement
CS(EE) 402.1	Differentiate how the choices of data structure & algorithm methods impact the performance of program.
CS(EE) 402.2	Solve problems based upon different data structure & also write programs.
CS(EE) 402.3	Identify appropriate data structure & algorithmic methods in solving problem.
CS(EE) 402.4	Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing
CS(EE) 402.5	Compare and contrast the benefits of dynamic and static data structures implementations.

Paper Name: Physics – II Laboratory
Paper Code: PH(EE) 491

COs	Statement
PH(EE) 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(EE) 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(EE) 491.3	Function effectively as an individual, and as a member or leader in laboratory sessions
PH(EE) 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: Electrical Machines – I Laboratory
Paper Code: EE 491

COs	Statement
EE 491.1	Perform different tests on d.c. machine, induction motor and transformer
EE 491.2	Interpret the observed result using theoretical knowledge and hence calculate unknown parameters

Paper Name: Electrical and Electronics Measurement Laboratory
Paper Code: EE 492

COs	Statement
EE 492.1	Conduct experiment to measure of Resistance, Inductance, Capacitance, Power, and Energy.
EE 492.2	Able to calibrate instruments and analyze the errors in measurement

Paper Name: Numerical Methods Laboratory
Paper Code: M(CS) 491

COs	Statement
M(CS) 491.1	Apply the programming skills to solve the problems using multiple numerical approaches
M(CS) 491.2	Analyze if the results are reasonable, and then interpret and clearly communicate the results.

Paper Name: Data Structure Laboratory
Paper Code: CS(EE) 492

COs	Statement
CS(EE) 492.1	Choose appropriate data structure as applied to specified problem definition.
CS(EE) 492.2	Handle operations like searching, insertion, deletion, traversing mechanism on various data structures.
CS(EE) 492.3	Have practical knowledge on the applications of data structures.
CS(EE) 492.4	Able to store, manipulate and arrange data in an efficient manner.
CS(EE) 492.5	Able to implement queue and stack using arrays and linked list. Implementation of queue, binary tree and binary search tree.

Paper Name: Technical skill Development
Paper Code: MC 481

COs	Statement
MC 481.1	Prepare lists of material for a mini project.
MC 481.2	Design an electric circuit as per the requirement of application.

CO-PO/PSO mapping

Paper Name: Physics – II
Paper Code: PH(EE) 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: Electrical Machines I
Paper Code: EE 401

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 401.1	3	3	-	3	-	-	-	-	-	-	-	3	3	3
EE 401.2	3	3	2	3	3	2	2	-	-	-	-	3	3	3
EE 401.3	3	3		3				-	-	-	-	3	3	3

Paper Name: Electrical and Electronics Measurement
Paper Code: EE402

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 402.1	3	2	2	-	-	2	2	-	-	-	-	3	2	2
EE 402.2	3	2	2	-	-	2	2	-	-	-	-	-	2	2
EE 402.3	3	2	2	-	-	-	-	-	-	-	-	-	2	2

Paper Name: Numerical Methods
Paper Code: M(CS) 401

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
M(CS) 401.1	3	3	2	3		2	2	-	-	-	-	-	3	-
M(CS) 401.2	-	-	-	-	3	2	2	-	-	-	-	-	-	3
M(CS) 401.3	-	3		3	-	2	2	-	-	-	-	3	-	-

Paper Name: Data Structure
Paper Code: CS(EE) 402

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 402.1	-	-	-	3		2	2	-	-	-	-	3	-	-
CS(EE) 402.2	-	3		3	3	2	2	-	-	-	3		-	-
CS(EE) 402.3	3	-	-	3	2	2	2	-	-	-	-	2	-	-
CS(EE) 402.4	-	3		3		2	2	-	-	-	3	-	-	-
CS(EE) 402.5	-	-	2	-	-	-	-	-	-	-	-	-	-	-

Paper Name: Physics – II Laboratory
Paper Code: PH(EE) 491

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
PH(EE) 491.1	-	-	3		3	2	2	-	-	-	-	-	3	-
PH(EE) 491.2	-	-	-	3	3	2	2	-	-	-	-	-	-	3
PH(EE) 491.3	-	-	-	-	3	2	2	-	3	-	-	-	-	-
PH(EE) 491.4	-	-	-	-	3	2	2	-	-	3	-	-	-	-

Paper Name: Electrical Machines – I Laboratory
Paper Code: EE 491

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 491.1	3	3	-	3	3	2	-	-	3	-	-	3	3	3
EE 491.2	3	3	-	3	3	2	-	-	3	-	-	3	3	3

Paper Name: Electrical and Electronics Measurement Laboratory
Paper Code: EE 492

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 492.1	3	3	3	3	2	2	-	-	-	-	-	2	3	-
EE 492.2	3	3	-	-	3	2	-	-	-	-	2	3	3	3

Paper Name: Numerical Methods Laboratory
Paper Code: M(CS) 491

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
M(CS) 491.1	-	3	2	3	3	2	-	-	-	-	-	-	3	-
M(CS) 491.2	-	3	2	3	3	2	-	-	-	-	-	-	-	-

Paper Name: Data Structure Laboratory
Paper Code: CS(EE) 492

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 492.1	-	3	-	3	-	-	2	-	-	-	-	-	-	-
CS(EE) 492.2	-	3	-	3	-	-	2	-	-	-	-	-	-	-
CS(EE) 492.3	-	-	-		-	-	2	-	-	-	-	-	-	-
CS(EE) 492.4	-	-	-	-	3	-	-	-	-	-	-	-	-	-
CS(EE) 492.5	-	3	-	-	-	-	2	-	-	-	-	-	-	-

Paper Name: Technical skill Development
Paper Code: MC 481

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
MC 481.1	-	-	-	-	3		2	3	-	-	3	-	-	-
MC 481.2	-	-	-	-	-		2	3	-	-	-	-	3	

B.Tech Fifth Semester Curriculum

A. THEORY							
Sl. No.	**Paper Code**	**Course Name**	**Contact Hours/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	HU 501	Environmental Science	2	0	0	2	2
2	EE 501	Electric Machine – II	3	1	0	4	4
3	EE 502	Power Systems – I	3	1	0	4	4
4	EE 503	Control Systems – I	3	1	0	4	4
5	EE 504	Microprocessor and Microcontroller	3	0	0	3	3
Total of Theory						**17**	**17**
B. PRACTICAL							
6	EE 591	Electric Machine – II Laboratory	0	0	3	3	2
7	EE 592	Power Systems – I Laboratory	0	0	3	3	2
8	EE 593	Control System – I Laboratory	0	0	3	3	2
9	EE 594	Microprocessor and Microcontroller Laboratory	0	0	3	3	2
10	EE581	Electrical System Design – I	0	1	3	4	2
Total of Practical						**16**	**10**
C. SESSIONAL							
11	MC 581	Group Discussion and Seminar	0	0	2	2	0
Total of Theory, Practical & Mandatory Activities / Courses						**35**	**27**

Paper Name: Environmental Science
Paper Code: HU 501

COs	Statement
HU 501.1	Student will be able ➢ To understand the natural environment and its relationships with human activities. ➢ To apply the fundamental knowledge of science and engineering to assess environmental and health risk. ➢ To develop guidelines and procedures for health and safety issues obeying the environmental laws and regulations. ➢ Acquire skills for scientific problem-solving related to air, water, noise & land pollution

Paper Name: Electric Machine – II
Paper Code: EE501

COs	Statement
EE 501.1	Based on different type of requirement know the applications of synchronous machine and fractional kW motors for a given application
EE 501.2	Understand the principle of operation and know performance of synchronous machine and fractional kW motors.
EE 501.3	Know different tests on electrical machine and determine the performance of synchronous machine.

Paper Name: Power Systems – I
Paper Code: EE502

COs	Statement
EE502.1	Understand the concept of power system, know various power system components and define associated terms.
EE502.2	Know different type of power generation.
EE502.3	Understand basic performances of power system.

Paper Name: Control Systems – I
Paper Code: EE 503

COs	Statement
EE503.1	Get knowledge of basic structure of control systems, define basic terminologies, components
EE503.2	Modeling physical systems using transfer function to analyze system dynamic and steady state behavior
EE503.3	Understand the concept of feedback system and controllers, design compensators in frequency domain

Paper Name: Microprocessor and Microcontroller
Paper Code: EE 504

COs	Statement
EE504.1	Able to correlate the architecture, instructions, timing diagrams, addressing modes, memory interfacing, interrupts, data communication of 8085
EE504.2	Able to interpret the 8086 Microprocessor-Architecture, Pin details, memory segmentation, addressing modes, basic instructions, interrupts
EE504.3	Recognize 8051 micro controller hardware, input/output pins, ports, external memory, counters and timers, instruction set, addressing modes, serial data i/o, interrupts
EE504.4	Apply instructions for assembly language programs of 8085, 8086 and 8051
EE504.5	Design peripheral interfacing model using IC 8255, 8253, 8251 with IC 8085, 8086 and 8051.

Paper Name: Electric Machine – II Laboratory
Paper Code: EE591

COs	Statement
EE591.1	Perform different tests on synchronous machine and single phase induction motor
EE591.2	Interpret the observed result using theoretical knowledge and hence calculate unknown parameters

Paper Name: Power Systems – I Laboratory
Paper Code: EE 592

COs	Statement
EE592.1	Able to estimate performance of Transmission Line and Distribution line
EE592.2	Able to select line support for a particular Transmission Line
EE592.3	Able to explain methods of active and reactive power control.
EE592.4	Able to test the reliability of different components of Transmission Line and Distribution Line

Paper Name: Control System – I Laboratory
Paper Code: EE 593

COs	Statement
EE593.1	Simulate, analyze system behavior using software simulator/hardware
EE593.2	Design compensators, controllers to meet desired performance of system.

Paper Name: Microprocessor and Microcontroller Laboratory
Paper Code: EE 594

COs	Statement
EE594.1	Able to solve small assignments using the 8085 basic instruction sets and memory mapping through trainer kit and simulator.
EE594.2	Able to write 8085 assembly language programs like Addition, Subtraction, Multiplication, Square, Complement, Look up table, Copying a block of memory, Shifting ,Packing and unpacking of BCD numbers, Ascending order, Descending order etc. using trainer kit.
EE594.3	Able to validate the interfacing technique using 8255 trainer kit through subroutine calls and IN/OUT instructions like glowing LEDs accordingly, stepper motor rotation etc.
EE594.4	Able to test fundamental of 8051 programs using the trainer kit.

Paper Name: Electrical System Design – I
Paper Code: EE 581

COs	Statement
EE581.1	Able to design Electrical Systems.
EE581.2	Able to develop an idea of preparing bill of materials for a particular design.

CO-PO/PSO mapping

Paper Name: Environmental Science
Paper Code: HU 501

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
HU 501.1	-	-	-	-	-	3	3	2	-	-	-	2	-	-
HU 501.2	-	-	-	-	-	3	2	2	-	-	-	2	-	-
HU 501.3	-	-	-	-	-	3	3	2	-	-	-	2	-	-
HU 501.4	-	-	-	-	-	-	3	2	-	-	-	2	-	-

Paper Name: Electric Machine – II
Paper Code: EE501

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 501.2	3	3	2	3	3	-	-	-	-	-	-	3	3	3
EE 501.3	3	3	2	2	3	-	-	-	-	-	-	2	3	3
EE 501.3	3	3	2	3	3	-	-	-	-	-	-	2	3	3

Paper Name: Power Systems – I
Paper Code: EE502

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 502.1	3	3	-	3	-	2	2	-	-	-	-	2	3	3
EE 502.2	3	3	-	3	-	2	2	-	-	-	-	2	3	3
EE 502.3	3	3	-	3	2	2	2	-	-	-	-	2	3	3

Paper Name: Control Systems – I
Paper Code: EE 503

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 503.1	3	3	3	3	3	2	2	-	-	-	-	2	3	3
EE 503.2	3	3	3	2	3	2	2	-	-	-	-	2	3	3
EE 503.3	3	2	2	2	3	2	2	-	-	-	-	2	3	3

Paper Name: Microprocessor and Microcontroller
Paper Code: EE 504

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 504.1	3	-	-	-	3	2	2	-	-	-	-	-	-	2
EE 504.2	3	-	-	2	3	2	2	-	-	-	-	-	-	2
EE 504.3	-	2	2		3	2	2	-	-	-	2	-	-	2
EE 504.4	-	2	3	2	3	2	2	-	-	-	2	2	-	-
EE 504.5	-	3	3	3	-	-	-	-	-	-	2	2	-	-

Paper Name: Electric Machine – II Laboratory
Paper Code: EE591

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 591.1	3	2	-	2	3	2	-	-	-	-	-	3	3	3
EE 591.2	3	2	-	3	3	2	-	-	-	-	-	3	3	3

Paper Name: Power Systems – I Laboratory
Paper Code: EE 592

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 592.1	3	3	3	-	3	2	2	-	3	-	-	3	3	3
EE 592.2	3	3	2	3	-	-	-	-	3	-	-	2	3	3
EE 592.3	3	3	-	3	3	2	2	-	3	-	-	3	3	3
EE 592.4	3	3	3	-	-	-	-	-	3	-	-	-	3	3

Paper Name: Control System – I Laboratory
Paper Code: EE 593

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 593.1	3	3	3	3	3	-	2	2	3	3	-	3	3	3
EE 593.2	3	3	3	3	3	-	2	2	3	2	-	3	3	3

Paper Name: Electrical System Design – I
Paper Code: EE 581

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE581.1	3	3	3	3	2	2	2	-	3	2	2	-	3	3
EE581.2	3	3	3	3	2	2	2	-	2	2	3	-	3	3

Paper Name: Microprocessor and Microcontroller Laboratory
Paper Code: EE 594

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 594.1	2	3	3	2	-	-	-	2	-	-	2	-	3	3
EE 594.2	2	3	3	3	-	-	-	2	-	-	2	-	3	3
EE 594.3	2	3	2	3	2	-	-	2	-	-	2	-	3	3
EE 594.4	2	3	2	-	-	-	-	2	-	-	-	-	3	3

B.Tech Sixth Semester Curriculum

A. THEORY							
Sl. No.	**Paper Code**	**Course Name**	**Contact Hours/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	EE 601	Control System II	3	0	0	3	3
2	EE 602	Power System II	3	0	0	3	3
3	EE 603	Power Electronics	3	0	0	3	3
4	EC(EE) 604	Digital Signal Processing*	3	0	0	3	3
5	EE 605	A. Non-conventional Energy Sources and Applications B. Computational Intelligence C. Introduction to Robotics D. Mechatronics	3	1	0	4	4
6	CS(EE) 606	A. Introduction to Programming in JAVA B. Object Oriented Programming using C++ C. Computer Architecture and Operating Systems D. Software Engineering	3	0	0	3	3
Total of Theory						**19**	**19**
B. PRACTICAL							
7	EE 691	Control System II Laboratory	0	0	3	3	2
8	EE 692	Power System II Laboratory	0	0	3	3	2
9	EE 693	Power Electronics Laboratory	0	0	3	3	2
10	CS(EE) 696	A. Introduction to Programming in JAVA Laboratory B. Object Oriented Programming using C++ Laboratory C. Computer Architecture and Operating Systems Laboratory D. Software Engineering Laboratory	0	0	2	2	1

Sl. No.	**Paper Code**	**Course Name**	**Contact Hours/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
11	EE 681	Electrical System Design II	0	1	3	4	2
12	EE 671	Industrial Training	4 Weeks				2
Total of Practical						**15**	**11**
Total of Theory and Practical						**34**	**30**

Paper Name: Control System II
Paper Code: EE 601

COs	Statement
EE601.1	Getknowledgeofbasicstructureofcontrolsystems,definebasicterminologies,components.
EE601.2	Modeling physical systems using transfer function to analyze system dynamic and steady state behavior.
EE601.3	Understand the concept of feedback system and controllers, design compensators in frequency domain.

Paper Name: Power System II
Paper Code: EE 602

COs	Statement
EE602.1	Understand and explain the balanced three phase networks, per unit (PU) system, representation of one-line diagram, power system stability
EE602.2	Apply the knowledge of load flow solution technique and solve problem load flow analysis using Gauss-Siedel method, Newton-Raphson method under loaded and unloaded conditions and analyse different power system faults(Symmetrical and unsymmetrical)
EE602.3	Understand and explain the principle of operation and performance of different types of relay, circuit breakers and implies it in different protection scheme.

Paper Name: Power Electronics
Paper Code: EE 603

COs	Statement
EE603.1	Acquire knowledge about fundamental concepts and techniques used in power electronics.
EE603.2	Analyze various single phase and three phase power converter circuits and understand their applications.
EE603.3	Identify basic requirements for power electronics based design application.
EE603.4	Develop skills to build, and troubleshoot power electronics circuits.
EE603.5	Understand the use of power converters in commercial and industrial applications.

Paper Name: Digital Signal Processing
Paper Code: EC(EE)604

COs	Statement
EC(EE)604.1	Able to define discrete systems in the Frequency domain using Fourier analysis tools like DFT, FFT.
EC(EE)604.2	Able to interpret the properties of discrete time signals in time domain and frequency domain.
EC(EE)604.3	Able to describe finite word length effects and digital filters.
EC(EE)604.4	Able to analyse convolution for long sequences of data.
EC(EE)604.5	Able to implement digital filters.

Paper Name: Non-conventional Energy Sources and Applications
Paper Code: EE 605A

COs	Statement
EE 605A.1	Student will be able to understand the importance of Renewable energy over conventional process and learn different methods of Power generation from the Non-conventional sources like Solar, Wind Energy, Biomass, Geothermal energy, OTEC, Tidal energy, MHD Power generation schemes.
EE 605A.2	Students will be able to analyze the different techniques of grid integration of the power generated from renewable energy sources with the initiation of power electronic converters and drives.
EE 605A.3	Students will be able to design different hybrid energy systems and energy storage systems.

Paper Name: Computational Intelligence
Paper Code: EE 605B

COs	Statement
EE 605B.1	Describe a basic exposition to the goals and methods of Computational Intelligence.
EE 605B.2	Apply the Intelligent techniques for problem solving.
EE 605B.3	Express problem solving skills using the acquired knowledge in the areas of, reasoning, natural language understanding, computer vision, automatic programming and machine learning.

Paper Name: Introduction to Robotics
Paper Code: EE 605C

COs	Statement
EE 605C.1	Demonstrate the basics knowledge and skills in practical robotics applications
EE 605C.2	Ability to apply mechanical structures of industrial robots and their operational workspace characteristics
EE 605C.3	Students will demonstrate knowledge of robot controllers.
EE 605C.4	Understand and demonstrate an ability to simulate, program, and control commercial Robots through hands-on experiments
EE 605C.5	Understand industrial environment for robotics system

Paper Name: Mechatronics
Paper Code: EE 605D

COs	Statement
EE 605D.1	Students can realize the importance of mechatronic system to perform complex tasks, can elaborate the step wise integration of sensors & actuators, control system, signal processing, power electronics.
EE 605D.2	Students will be able to demonstrate basic operations of PLC, different control theory and understand mechatronic applications.

Course Name: Introduction to Programming in JAVA
Course Code: CS(EE) 606A

COs	Statement
CS(EE) 606A.1	Design the process of interaction between Objects, classes & methods w.r.t. Object Oriented Programming.
CS(EE) 606A.2	Acquire a basic knowledge of Object Orientation with different properties as well as different features of Java.
CS(EE) 606A.3	Analyze various activities of different string handling functions with various I/O operations.
CS(EE) 606A.4	Discuss basic Code Reusability concept w.r.t. Inheritance, Package and Interface.
CS(EE) 606A.5	Implement Exception handling, Multithreading and Applet (Web program in java) programming concept in Java.

Paper Name: Object Oriented Programming using C++
Code: CS(EE) 606B

COs	Statement
CS(EE) 606B.1	Demonstrate the fundamental principles of OO programming and key principles in OO analysis, design, and development.
CS(EE) 606B.2	Apply the knowledge of Unified Modeling Language (UML) towards analysis and design.
CS(EE) 606B.3	Implement common patterns in OO design.

Paper Name: Computer Architecture and Operating Systems
Code: CS(EE) 606C

COs	Statement
CS(EE) 606C.1	Recognize the main components of a typical computer, analyse and communicate their individual behaviour, as well as their interactions.
CS(EE) 606C.2	Identify the main components of an operating system (OS), analyse and communicate the structure and behaviour of OS components in isolation, as well as their interactions.
CS(EE) 606C.3	Apply the principles of resource management and concurrency to analyse the main design problems at the Operating System level, and critically evaluate the approaches taken by modern-day operating systems in solving them.
CS(EE) 606C.4	Critically evaluate security risks in operating systems and the role operating systems can and should play in establishing security.

Paper Name: Software Engineering
Code: CS(EE) 606D

COs	Statement
CS(EE) 606D.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(EE) 606D.2	To analyze, elicit and specify software requirements through a productive working relationship with various stakeholders of the project
CS(EE) 606D.3	To design applicable solutions in one or more application domains using software engineering approaches that integrates ethical, social, legal and economic concerns.
CS(EE) 606D.4	To acquire the ability to function effectively in teams.
CS(EE) 606D.5	To develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice.
CS(EE) 606D.6	To identify modern engineering tools necessary for software project management, time management and software reuse, and an ability to engage in life-long learning.

Paper Name: Industrial Training
Code: EE 671

COs	Statement
EE671.1	Student will be able to participate in the projects in industries during his or her industrial training.
EE671.1	Student will be able to describe use of advanced tools and techniques encountered during industrial training and visit
EE671.1	Student will be able to interact with industrial personnel and follow engineering practices and discipline prescribed in industry.
EE671.1	Student will be able to develop awareness about general workplace behaviour and build interpersonal and team skills.
EE671.1	Student will be able to prepare professional work reports and presentations

Paper Name: Control System II Laboratory
Code: EE 691

COs	Statement
EE 691.1	Student will be able to perform experiments on nonlinearity.
EE 691.2	Student will be able to take initiative to identify, formulate and analyse problems regarding lead-lag compensation, state variable analysis using simulation tools.
EE 691.3	Student will be able to write report on the performed experiment.
EE 691.4	Student will be able to perform the experiment effectively as an individual using MATLAB and hardware equipment.
EE 691.5	Student will be able to provide meaningful solutions by applying knowledge acquired in non-linear control system.
EE 691.6	Student will be able to function as a member or leader in team regularly.

Paper Name: Power System II Laboratory
Paper Code: EE692

COs	Statement
EE 692.1	Analyze the testing, operation and response of protection of electrical instruments.
EE 692.2	Conduct experimental investigation and gain knowledge of various parts of relays and its operation.
EE 692.3	Able to incorporate the measuring error with actual value and calibrate the instruments transformer.
EE 692.4	Enhance the capability of software analysis by load flow solution in ETAP, MATLAB etc.

Paper Name: Power Electronics Laboratory
Paper Code: EE693

COs	Statement
EE 693.1	The skill to analyze the response of any power electronics devices.
EE 693.2	The ability to troubleshoot the operation of a power electronics circuit.
EE 693.3	The ability to select suitable power electronic devices for a given application.
EE 693.4	The ability to know how to control and convert output signal as per requirements.
EE 693.5	The ability to construct any power electronics circuits as needed in operation.

Paper Name: Introduction to Programming in JAVA Laboratory
Paper Code: CS(EE) 696A

COs	Statement
EE 696A.1	Implement the process of object orientation in java with the help of Class-object-Constructor relationship in Object Oriented Programming
EE 696A.2	Implement basic knowledge of code reusability with the help of Java in Object Oriented Programming.
EE 696A.3	Analyze the significance of various keywords w.r.t Encapsulation and polymorphism technique in OOPs.Implements exception handling in Java.
EE 696A.4	Discuss basic Data abstraction concept w.r.t. Inheritance, Package and Interface
EE 696A.5	Implement Exception handling, Multithreading and Applet (Web program in java) programming concept in Java

Paper Name: Object Oriented Programming using C++ Laboratory
Paper Code: CS(EE) 696B

COs	Statement
EE 696B.1	Identify importance of object oriented programming and difference between structured oriented and object oriented programming features.
EE 696B.2	Demonstrate use of objects and classes for developing programs.
EE 696B.3	Apply various object oriented concepts to solve different problems.

Paper Name: Computer Architecture and Operating Systems Laboratory
Paper Code: CS(EE) 696C

COs	Statement
EE 696C.1	Compare the performance of various CPU Scheduling Algorithms.
EE 696C.2	Implement Deadlock avoidance and Detection Algorithms.
EE 696C.3	Implement Semaphores.
EE 696C.4	Create processes and implement IPC.
EE 696C.5	Analyze the performance of the various Page Replacement Algorithms.
EE 696C.6	Implement File Organization and File Allocation Strategies.

Paper Name: Software Engineering Laboratory
Paper Code: CS(EE) 696D

COs	Statement
EE 696D.1	To handle software development models through rational method.
EE 696D.2	To prepare SRS document, design document, test cases and software configuration management and risk management related document.
EE 696D.3	To Develop function oriented and object oriented software design using tools like rational rose.
EE 696D.4	To perform unit testing and integration testing.
EE 696D.5	To apply various white box and black box testing techniques.

Paper Name: Electrical System Design II
Paper Code: EE 681

COs	Statement
EE 681.1	Gain knowledge of designing a system.
EE 681.2	Synchronize different machines in a system.
EE 681.3	Use of theoretical designing concept to implement a practical model.
EE 681.4	Estimate and planning system.

CO-PO/PSO mapping

Paper Name: Control System II
Paper Code: EE 601

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 601.1	3	3	3	3	2	-	-	-	-	-	2	2	2	2
EE 601.2	3	3	3	3	2	-	-	-	-	-	2	2	2	2
EE 601.3	3	3	3	3	2	-	-	-	-	-	2	2	2	2

Paper Name: Power System II
Paper Code: EE 602

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 602.1	2	2	2	2	1	-	3	-	-	2	2	3	3	3
EE 602.2	3	3	3	3	2	-	3	-	-	2	2	3	3	3
EE 602.3	3	3	3	2	-	-	3	-	-	2	2	-	3	3

Paper Name: Power Electronics
Paper Code: EE 603

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 603.1	3	3	3	2	1	-	-	-	-	2		2	3	3
EE 603.2	3	3	3	3		-	-	-	-	2	-	2	3	3
EE 603.3	3	3	3	-	-	-	-	-	-	2	-	2	3	3
EE 603.4	3	3	3	3	-	-	-	-	-	2	-	2	3	3
EE 603.5	3	3	3	-	-	-	-	-	-	2	-	2	3	3

Paper Name: Digital Signal Processing
Paper Code: EC(EE)604

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC(EE) 604.1	3	-	-	-	3	-	-	-	-	-	-	-	-	-
EC(EE) 604.2	3	3	-	3	-	-	-	-	-	-	-	-	-	-
EC(EE) 604.3	3	3	-	3	-	-	-	-	-	-	-	-	-	-
EC(EE) 604.4	3	3	-	-	-	-	-	-	-	-	-	-	3	-
EC(EE) 604.5	3		3	3	-	-	-	-	-	-	-	-	3	-

Paper Name: Non-conventional Energy Sources and Applications
Paper Code: EE 605A

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 605A.1	2	2	2	1	-	3	3	-	-	-	-	2	2	3
EE 605A.2	2	2	2	1	-	3	3	-	-	-	-	2	3	3
EE 605A.3	2	2	2	1	-	3	3	-	-	-	-	2	2	2

Paper Name: Computational Intelligence
Paper Code: EE 605B

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 605B.1	3	3	3	2	-	-	-	-	-	-	-	2	-	-
EE 605B.2	3	3	3	3	3	2	-	-	-	-	1	3		-
EE 605B.3	3	3	3	3	3	2	-	-	-	-	1	3		-

Paper Name: Introduction to Robotics
Paper Code: EE 605C

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 605C.1	3	3	2	2	3	-	-	-	-	-	-	3	-	-
EE 605C.2	3	3	2	2	3	-	-	-	-	-	-	3		-
EE 605C.3	2	3	3	3	2	-	-	-	-	-	-	2		-
EE 605C.4	2	2	-	2	-	2	-	-	-	-	-	-	-	-
EE 605C.5	2	-	2	-	-	1	-	-	-	-	-	-	-	-

Course Name: Mechatronics
Course Code: EE 605D

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 605D.1	3	3	2	2	2	-	-	-	-	-	-	2	3	-
EE 605D.2	3	3	2	2	2	-	-	-	-	-	-	2	3	3

Paper Name: Control System II Laboratory
Code: EE 691

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 691.1	3	3	3	2	3	2	2	-	3	-	2	1	3	3
EE 691.2	3	3	3	2	3	2	2	-	3	-	2	1	3	3
EE 691.3	3	3	3	2	3	2	2	-	3	3	1	-	3	3
EE 691.4	3	3	3	2	3	2	2	-	3		1	2	3	3
EE 691.5	3	3	3	2	3	2	2	-	3	-	2	-	3	3
EE 691.6	3	3	3	2	3	2	2	-	3	-	2	-	3	3

Course Name: Introduction to Programming in JAVA
Course Code: CS(EE) 606A

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 606A.1	3	-	3		2	2	2	-	-	-	-	-	3	-
CS(EE) 606A.2	3	-	-	-	2	2	2	-	-	-	-	-		-
CS(EE) 606A.3	3	3	-	-	2	2	2	-	-	-	-	-	3	-
CS(EE) 606A.4	3	-	-	-	2	2	2	-	-	-	-	-	-	-
CS(EE) 606A.5	3	-	-	3	-	-	-	-	-	-	-	-	-	-

Paper Name: Object Oriented Programming using C++
Code: CS(EE) 606B

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 606B.1	3	3	3	3	2	-	-	-	2	-	2	2	-	-
CS(EE) 606B.2	3	3	3	3	2	-	-	-	2	-	2	2	-	-
CS(EE) 606B.3	3	3	3	3	2	-	-	-	2	-	2	2	-	-

Paper Name: Computer Architecture and Operating Systems
Code: CS(EE) 606C

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 606C.1	3	3	2	2	3	2		-	-	-	-	-	-	-
CS(EE) 606C.2	3	3	3	3	3	2		-	-	-	-	-	-	-
CS(EE) 606C.3	3	3	2	3	3	2		-	-	-	-	-	3	-
CS(EE) 606C.4	3	3	2	2	3	2		-	-	-	-	-	-	-

Paper Name: Software Engineering
Code: CS(EE) 606D

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 606D.1	3	2	2	3	3	2	-	-	-	-	-	-	-	-
CS(EE) 606D.2	3	-	-	2	3	2	-	-	-	-	-	-	-	-
CS(EE) 606D.3	2	3	2	3	3	2	-	-	-	-	-	-	3	-
CS(EE) 606D.4	3	3	3	2	3	2	-	-	-	-	-	-	-	-
CS(EE) 606D.5	2	2	2	2	3	2	-							
CS(EE) 606D.6	2	3	3	2	2	2	-							

Paper Name: Introduction to Programming in JAVA Laboratory
Paper Code: CS(EE) 696A

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 696A.1	3		2		3	2	2	-	-	-	-	-	-	-
CS(EE) 696A.2	3	-	-	-	3	2	2	-	-	-	-	-	-	-
CS(EE) 696A.3		3			3	2	2	-	-	-	-	-	3	-
CS(EE) 696A.4	3	-	-	-	3	2	2	-	-	-	-	-	-	-
CS(EE) 696A.5	3	-	-	3	3	2	2	-	-	-	-	-	-	-

Paper Name: Power Electronics Laboratory
Paper Code: EE693

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 693.1	3	3	2		2		2						3	2
EE 693.2	3	3	2	3	3	2	1						3	2
EE 693.3	3	3	2		3	1	1						3	2
EE 693.4	3	3	3		3	2	2						3	2
EE 693.5	3	3	2		3	1	1						3	2

Paper Name: Power System II Laboratory
Paper Code: EE692

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 692.1	3	3	-	-	-	2	2	-	-	-	-	-	3	3
EE 692.2	3	3	3	3	2	2	2	-	-	-	-	-	3	3
EE 692.3	3	3	-	3	2	2	2	-	-	-	-	-	3	3
EE 692.4	3	-	-	-	-	2	2	-	-	-	-	-	3	3

Paper Name: Electrical System Design II
Paper Code: EE 681

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 681.1	3	3	3	3	2	2	2		3	2	2		3	3
EE 681.2	3	3	3	3	2	2	2		2	2	3		3	3
EE 681.3	3	3	3	3	2	2	2		3	2	2		3	3
EE 681.4	3	3	3	3	2	2	2		2	2	3		3	3

Paper Name: Electrical System Design II
Paper Code: EE 681

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 681.1	3	3	3	3	2	2	2		3	2	2		3	3
EE 681.2	3	3	3	3	2	2	2		2	2	3		3	3
EE 681.3	3	3	3	3	2	2	2		3	2	2		3	3
EE 681.4	3	3	3	3	2	2	2		2	2	3		3	3

Paper Name: Industrial Training
Paper Code: EE 671

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 671.1	3	-	-	-	3	-	3	3	3	3	-	3	-	3
EE 671.2	3	-	-	-	3	-	3	3	3	3	-	3	-	2
EE 671.3	3	-	-	-	3	-	3	3	3	3	-	3	-	3
EE 671.4	3	-	-	-	3	-	3	3	3	3	-	3	-	2
EE 671.15	3	-	-	-	3	-	3	3	3	3	-	3	-	3

Paper Name: Object Oriented Programming using C++ Laboratory
Paper Code: CS(EE) 696B

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 696B.1	3	3	3	-	3	-			3	3	-	3	-	-
CS(EE) 696B.2	3	3	3	-	3	-			3	3	-	3	-	-
CS(EE) 696B.3	3	3	3	-	3	-			3	3	-	3	-	-

Paper Name: Computer Architecture and Operating Systems Laboratory
Paper Code: CS(EE) 696C

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 696C.1	3	2	3	2	2	-	-	-	-	-	-	3	-	-
CS(EE) 696C.2	3	2	2	-	-	-	-	-	-	-	-	2	-	-
CS(EE) 696C.3	3	2	3	2	3	-	-	-	-	-	-	-	-	-
CS(EE) 696C.4	3	3	-	-	-	-	-	-	-	-	-	-		
CS(EE) 696C.5	3	2	-	-	-	-	-	-	-	-	-	2		
CS(EE) 696C.6	3	2	2	1	-	-	-	-	-	-	-	2		

Paper Name: Software Engineering Laboratory
Paper Code: CS(EE) 696D

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 696D.1	3	3	3	2	2	-	-	-	-	-	-	3	-	-
CS(EE) 696D.2	3	2	3	-	-	-	-	-	-	-	-	2	-	-
CS(EE) 696D.3	3	2	3	2	3	-	-	-	-	-	-	-	-	-
CS(EE) 696D.4	3	3	-	-	-	-	-	-	-	-	-	-		
CS(EE) 696D.5	3	2	-	-	-	-	-	-	-	-	-	2		

Paper Name: Object Oriented Programming using C++ Laboratory
Paper Code: CS(EE) 696B

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 696B.1	3	3	3	-	3	-			3	3	-	3	-	-
CS(EE) 696B.2	3	3	3	-	3	-			3	3	-	3	-	-
CS(EE) 696B.3	3	3	3	-	3	-			3	3	-	3	-	-

B.Tech Seventh Semester Curriculum

A. THEORY							
Sl. No.	**Paper Code**	**Course Name**	**Contact Hours/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
1	HU 702	Values and Ethics in Profession	2	0	0	2	2
2	EE 701	Electric Drives	3	0	0	3	3
3	EE 702	A. Utilization of Electric Power B. Advanced Power Electronics C. Illumination Engineering	3	1	0	4	4
4	EE 703	A. Advanced Power Systems B. Power Generation and Economics C. High Voltage Engineering D. Advanced Electrical Measurementand Instrumentation	3	1	0	4	4
5	CS(EE) 705	A. Artificial Intelligence and Soft Computing B. Digital Image Processing C. Computer Networking D. Data Base Management System	3	0	0	3	3
Total of Theory						**16**	**16**
B. PRACTICAL							
7	EE 791	Electric Drives Laboratory	0	0	3	3	2
8	CS(EE) 795	A. Artificial Intelligence and Soft Computing Laboratory B. Digital Image Processing Laboratory C. Computer Networking Laboratory D. Data Base Management System Laboratory	0	0	2	2	1
9	EE 781	Assigned Project – I	0	0	6	6	4
10	EE 771	Seminar on Industrial Training and Report	0	0	0	0	1
Total of Practical						**11**	**08**
Sl. No.	**Paper Code**	**Course Name**	**Contact Hours/Week**				**Credit Points**
			L	**T**	**P**	**Total**	
11	MC 781	Entrepreneurship Development	0	0	0	2	0
Total of Theory, Practical & Mandatory Activities / Courses						29	24

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

COs	Statement
HU 702.1	Understand the core values that shape the ethical behavior of an engineer andExposed 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: Electric Drives
Paper Code: EE 701

COs	Statement
EE701.1	Student will be able to select electric motors for a particular drive based on their characteristics.
EE701.2	Student will be able to accrue the knowledge of speed-control of DC motors and Induction motors.
EE701.3	Student will be able to accrue the knowledge of power electronic converters used for DC motor and Induction motor speed control

Paper Name: Utilization of Electric Power
Paper Code: EE 702A

COs	Statement
EE702A.1	Ability to formulate and then analyze the working of traction motor & their control using mathematical model under loaded and unloaded conditions.
EE702A.2	Ability to understand and explain the principle of operation and performance of traction motor.
EE702A.3	Skill to analyze the response of d.c. motor, induction motor and transformer.
EE702A.4	Ability to troubleshoot the operation of d.c. motor, induction motor and transformer.
EE702A.5	Ability to analyze the working of Electric Heating, welding processes.
EE702A.6	Ability to calculate illumination level for a given application and then select the suitable specification for installation.

Paper Name: Illumination Engineering
Paper Code: EE 702C

COs	Statement
EE702C.1	Understand the need for good illumination and learning the physics behind various luminous sources, other terms & units.
EE702C.2	Apply the Laws of Illumination; understand the measurement of light by using photometry.
EE702C.3	Analyze the working principles of various Electric light sources and their operating characteristics.
EE702C.4	Able to design and Lighting Calculations, Design of Energy efficient lighting systems for energy conservation & maintenance of lighting system.

Paper Name: Advanced Power Systems
Paper Code: EE 703A

COs	Statement
EE703A.1	Acquire in-depth advance knowledge in the domain of modern and industrial oriental power systems.
EE703A.2	Ability to critically analyze various power systems components, models and their operation, optimization of cost criteria.
EE703A.3	Ability to apply fundamentals and concepts to analyze, formulate and solve complex problems of electrical power systems and its components and control of frequency and voltages.
EE703A.4	Ability to use advanced techniques, skills and modern scientific and engineering tools for professional practice for power system to enhanced power quality, Stability, reliability, security and load ability.

Paper Name: Power Generation and Economics
Paper Code: EE 703B

COs	Statement
EE703B.1	Describe and analyze different types of sources and mathematical expressions related to with power generation and economics.
EE703B.2	Combine concepts of previously learnt courses to define the working principle of diesel power plant, its layout, safety principles and compare it with plants of other types.
EE703B.3	Discuss the working principle and basic components of the steam power plants, hydroelectric plants, nuclear power plant and the economic principles and safety precautions involved with it.
EE703B.4	Discuss and analyze the mathematical and working principles of different electrical equipments involved in the generation of power.
EE703B.5	Solve the problems related to the economic dispatch of power, plant scheduling, unit commitment and formulate strategies to minimize transmission line losses and penalties imbibed & analyze various power systems components, models and their operation, optimization of cost criteria
EE703B.6	Use advanced techniques, skills and modern scientific and engineering tools for professional practice for power system to enhanced power quality, reliability, security and load ability.

Paper Name: High Voltage Engineering
Paper Code: EE 703C

COs	Statement
EE703C.1	Understand the basic physics associated with various breakdown processes in different insulating materials.
EE703C.2	Knowledge of generation and measurement of A. C., D.C.,Impulse voltages and currents
EE703C.3	Knowledge of tests on H.V. equipment and on insulating materials, as per the standards
EE703C.4	Knowledge of the causes of Overvoltages in power system and Insulation Coordination in a substation

Paper Name: Advanced Electrical Measurement and Instrumentation
Paper Code: EE 703D

COs	Statement
EE703D.1	Demonstrate the Advanced Electrical measuring system.
EE703D.2	Apply different intelligent measuring instruments.

Paper Name: Advanced Power Electronics
Paper Code: EE 702B

COs	Statement
EE702B.1	Describe the basic concepts of resonant converters, matrix converter and multilevel inverter.
EE702A.2	Describe the basic concepts of matrix converter and multilevel inverter.
EE702A.3	Apply the knowledge of contemporary technical issues in Power electronics field and Compensators currently used in modern industries.

Paper Name: Artificial Intelligence and Soft Computing
Paper Code: CS(EE) 705A

COs	Statement
CS(EE) 705A.1	Understand various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction).
CS(EE) 705A.2	Apply facts, rules, and concepts of knowledge representation (logic-based, frame-based, semantic nets), inference and theorem proving.
CS(EE) 705A.3	Analyze working knowledge of reasoning in the presence of incomplete and/or uncertain information.
CS(EE) 705A.4	Evaluate and create knowledge representation, reasoning, and machine learning techniques for the solution of real-world problems.

Paper Name: Digital Image Processing
Paper Code: CS(EE) 705B

COs	Statement
CS(EE) 705B.1	Have a clear idea on Digital Imaging fundamentals and Importance of Digital Image Transform.
CS(EE) 705B.2	Understanding the importance of Digital Image enhancement in spatial and frequency domain and filtering techniques
CS(EE) 705B.3	Explaining the requirements and types of Image Compression and its standards.
CS(EE) 705B.4	Demonstrate the basic concepts of Digital Image Restoration and Segmentation of Digital Images.
CS(EE) 705B.5	Familiarize with Edge detection techniques and concepts on security in Digital Image Processing.

Paper Name: Computer Networking
Paper Code: CS(EE) 705C

COs	Statement
CS(EE) 705C.1	Understand OSI and TCP/IP models.
CS(EE) 705C.2	Analyze MAC layer protocols and LAN technologies.
CS(EE) 705C.3	Design applications using internet protocols.
CS(EE) 705C.4	Implement routing and congestion control algorithms.
CS(EE) 705C.5	Develop application layer protocols and understand socket programming

Paper Name: Data Base Management System
Paper Code: CS(EE) 705D

COs	Statement
CS(EE) 705D.1	Apply the knowledge of Entity Relationship (E-R) diagram for an application.
CS(EE) 705D.2	Create a normalized relational database model
CS(EE) 705D.3	Analyze real world queries to generate reports from it.
CS(EE) 705D.4	Determine whether the transaction satisfies the ACID properties.
CS(EE) 705D.5	Create and maintain the database of an organization.

Paper Name: Seminar on Industrial Training and Report
Paper Code: EE771

COs	Statement
EE771.1	Student will be able to describe use of advanced tools and techniques encountered during industrial training and visit.
EE771.2	Student will be able to relate with industrial personnel and follow engineering practices and discipline prescribed in industry
EE771.3	Student will be able to develop awareness about general workplace behaviour and build interpersonal and team skills.
EE771.4	Student will be able to prepare professional work reports and presentations.

Paper Name: Electric Drives Laboratory
Paper Code: EE 791

COs	Statement
CS(EE) 791.1	Student will be able to apply power electronic converters for motor speed control.
CS(EE) 791.2	Student will be able to analyze the characteristics of electric motors for different type of loads.

Paper Name: Artificial Intelligence and Soft Computing Laboratory
Paper Code: CS(EE) 795A

COs	Statement
CS(EE) 795A.1	Understand and recognize various AI search algorithms and AI tools.
CS(EE) 795A.2	Apply the fundamentals of knowledge representation, inference and theorem proving using AI tools.
CS(EE) 795A.3	Analyze working knowledge of reasoning in the presence of incomplete and/or uncertain information.
CS(EE) 795A.4	Evaluate and create knowledge representation, reasoning, and machine learning techniques for the solutions of real-world problems.

Paper Name: Digital Image Processing Laboratory
Paper Code: CS(EE) 795B

COs	Statement
CS(EE) 795B.1	Build knowledge on Digital Imaging fundamentals and Digital Image Transform.
CS(EE) 795B.2	Understanding Digital Image enhancement techniques in spatial and frequency domain.
CS(EE) 795B.3	Explaining the requirements and types of Image Compression and its standards.
CS(EE) 795B.4	Demonstrate the Digital Image Restoration and Segmentation of Digital Images.
CS(EE) 795B.5	Build ideas on Edge detection techniques and concepts on Digital Image security.

Paper Name: Computer Networking Laboratory
Paper Code: CS(EE) 795C

COs	Statement
CS(EE) 795C.1	Demonstrate the socket program using TCP & UDP.
CS(EE) 795C.2	Develop simple applications using TCP & UDP.
CS(EE) 795C.3	Develop the code for Data link layer protocol simulation.
CS(EE) 795C.4	Examine the performances of Routing protocol.
CS(EE) 795C.5	Experiment with congestion control algorithm using network simulator

Paper Name: Data Base Management System Laboratory
Paper Code: CS(EE) 795D

COs	Statement
CS(EE) 795D.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(EE) 795D.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 databases like partial multimedia and mobile databases.
CS(EE) 795D.3	Differentiate between DBMS and advanced DBMS and use of advanced database concepts and become proficient in creating database queries.
CS(EE) 795D.4	Analyze database system concepts and apply normalization to the database.
CS(EE) 795D.5	Apply and create different transaction processing and concurrency control applications.

Paper Name: Assigned Project - 1
Paper Code: EE 781

COs	Statement
EE 781.1	Undertake problem identification, formulation and solution.
EE 781.2	Design engineering solutions to complex problems utilizing a systems approach
EE 781.3	Communicate with engineers and the community at large in written an oral forms.
EE 781.4	Demonstrate the knowledge, skills and attitudes of a professional engineer.

Paper Name: Entrepreneurship Development
Paper Code: EE(MC)781

COs	Statement
EE MC781.1	Student will be able toidentify qualities of entrepreneurs
EE MC781.2	Student will be able to write project proposal
EE MC781.3	Student will be able touse various entrepreneurship models.
EE MC781.4	Student will be able tounderstand various schemes supporting entrepreneurship.
EE MC781.5	Student will be able tothink creative and innovative.

CO-PO/PSO mapping

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
HU 702.1	-	-	-	-	-	3	2	3	-	-	2	-	-	-
HU 702.2	-	-	-	-	-	3	-	3	-	-	2	-	-	-
HU 702.3	-	-	-	-	-	3	2	3	-	-	2	-	-	-
HU 702.4	-	-	-	-	-	3	-	3	-	-	2	-	-	-
HU 702.5	-	-	-	-	-	3	-	3	-	-	2	-	-	-

Paper Name: Electric Drives
Paper Code: EE 701

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 701.1	3	2	2	2	3	3	-	-	-	-	-	2	2	2
EE 701.2	3	2	2	3	3	3	-	-	-	-	-	2	2	2
EE 701.3	3	2	2	2	3	3	-	-	-	-	-	2	2	2

Paper Name: Utilization of Electric Power
Paper Code: EE 702A

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 702A.1	3	3	3	2	3	2	2	1	-		2	-	3	3
EE 702A.2	3	3	3	2	3	2	2	1	-		2	-	3	3
EE 702A.3	-	3		3	3	2	1	-	-		2	-	3	3
EE 702A.4	3	-	2	3	3	2	1	-	-		2	-	3	3
EE 702A.5	-	-	2	-	3	2	1	-	-		2	-	3	3
EE 702A.6	3	-	-	-	3	2	1	-	-	2	2	-	3	3

Paper Name: Advanced Power Electronics
Paper Code: EE 702B

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE702B.1	3	3	3	2	3	2	2	-	-		2	2	3	
EE702B.2	3	-	-	-	3	2	2	-	-		2	1	-	-
EE702B.3	-	3		3	3	2	2	-	-		2	1	3	

Paper Name: Illumination Engineering
Paper Code: EE 702C

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 702C.1	3	3	3	2	3	2	2	-	-		2	2	3	
EE 702C.2	3	-	-	-	3	2	2	-	-		2	1	-	-
EE 702C.3	-	3		3	3	2	2	-	-		2	1	3	
EE 702C.4	2	2	1		2	2	2							

Paper Name: Advanced Power Systems
Paper Code: EE 703A

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 703A.1	3	3	3	3	2	2	2	-	-	-	-	2	2	3
EE 703A.2	3	3	3	3	2	2	2	-	-	-	-	2	3	3
EE 703A.3	3	3	3	3	2	2	2	-	-	-	-	2	3	2
EE 703A.4	3	3	3	3	2	2	2	-	-	-	-	2	-	3

Paper Name: Power Generation and Economics
Paper Code: EE 703B

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 703B.1	2	2	2	3	3	1	1	-	-		-	1	3	
EE 703B.2	3	3	3	3	2	-	1	-	-			2	-	-
EE 703B.3	3	2	2	2	-	1	2					1	3	
EE 703B.4	3	2	3	1	2	-	1					1		
EE 703B.5	3	1	3	2	-	-	2					2		

Paper Name: High Voltage Engineering
Paper Code: EE 703C

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 703C.1	3	3	1	-	-	-	-	-	-	-	2	3		
EE 703C.2	3	3	1	-	-	-	-	-	-	-	2	3		
EE 703C.3	3	2	2	-	-	-	-	-	-	-	2	3		
EE 703C.4	3	3	2	-	-	-	-	-	-	-	2	3		

Paper Name: Advanced Electrical Measurement and Instrumentation
Paper Code: EE 703D

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 703D.1	3	2	2	-	-	-	-	-	-	-	2	2		
EE 703D.2	3	2	3	-	-	-	-	-	-	-	2	3		

Paper Name: Artificial Intelligence and Soft Computing
Paper Code: CS(EE) 705A

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 705A.1	3	2	3	3	-	2	-	-	-	-	-	-	-	2
CS(EE) 705A.2	2	2	3	3	-	2	-	-	-	-	-	-	2	-
CS(EE) 705A.3	2	3	1	3	-	2	-	-	-	-	-	-	2	3
CS(EE) 705A.4	2	3	1	3	-	2			-	-	-	-	2	3

Paper Name: Digital Image Processing
Paper Code: CS(EE) 705B

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 705B.1	3	2	2	2	-	-	-	-	-	-	-	3		-
CS(EE) 705B.2	3	3	2	2	-	-	-	-	-	-	-	2		-
CS(EE) 705B.3	3	3	3	2	2	-	-	-	-	-	-	2		
CS(EE) 705C.4	3	3	2	-	2	-	-	-	-	-	-	2		
CS(EE) 705C.5	3	3	2	-	2	-	-	-	-	-	-	3		

Paper Name: Computer Networking
Paper Code: CS(EE) 705C

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 705C.1	3	-	-	-	3	2	2	-	-	2	2	-	-	-
CS(EE) 705C.2		3	-	-	3	2	2	-	-	2	2	-	-	-
CS(EE) 705C.3	-	-	3		3	2	2	-	-	2	2	-	3	-
CS(EE) 705C.4	3	-	-	-	3	2	2	-	-	2	2	-	3	-
CS(EE) 705C.5	-	-	3		3	2	2	-	-	2	2	-	-	3

Paper Name: Data Base Management System
Paper Code: CS(EE) 705D

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE)705D.1	2	2	2	2	3	2	-	-	2	2	3	2	-	-
CS(EE)705D.2	2	3	3	3	3	1	-	-	2	2	3	2	-	-
CS(EE)705D.3	3	3	2	3	3	2	-	-	3	3	3	2	-	-
CS(EE)705D.4	2	2	2	2	3	2	-	-	2	2	3	3	-	-
CS(EE)705D.5	2	3	3	3	3	1	-	-	2	2	3	3	-	-

Paper Name: Electric Drives Laboratory
Paper Code: EE 791

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 791.1	3	-	2	2	2	2	-	-	-	-	-	-	-	2
EE 791.2	-	3	2	2	2	2	-	-	-	-	-	-	3	2

Paper Name: Seminar on Industrial Training and Report
Paper Code: EE 771

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE771.1	3	3					3	3	3	3	3	3	3	3
EE771.2	3	3					3	3	3		3			
EE771.3	3	3					3	3		3	3	3		
EE771.4	3	3					3	3		3		3	3	3

Paper Name: Artificial Intelligence and Soft Computing Laboratory
Paper Code: CS(EE) 795A

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 795A.1	3	3	2	2	2	2	-	-	-	-	-	-	-	-
CS(EE) 795A.2	3	3	2	2	2	2	-	-	-	-	-	-	-	-
CS(EE) 795A.3	3	2	3	2	3	2	-	-	-	-	-	-	-	-
CS(EE) 795A.4	2	2	2	2	3	2	-	-	-	-	-	-	-	-

Paper Name: Digital Image Processing Laboratory
Paper Code: CS(EE) 795B

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 795B .1	2	3	2	2	1	-	-	-	-	-	2	3	2	-
CS(EE) 795B.2	2	3	2	-	2	-	-	-	-	-	2	3	2	-
CS(EE) 795B.3	3	2	1	2	-	-	-	-	-	-	1	3	3	
CS(EE) 795B.4	3	3	-	-	2	-	-	-	-	-	1	3	3	
CS(EE) 795B.5	3	2	2	2	-	-	-	-	-	-	1	3	3	

Paper Name: Computer Networking Laboratory
Paper Code: CS(EE) 795C

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 795C.1	3	-	-	2	3	2	-	-	-	-	-	-	-	-
CS(EE) 795C.2	-	3		2	3	2	-	-	-	-	-	-	3	-
CS(EE) 795C.3	-	-	3	2	3	2	-	-	-	-	-	-	3	-
CS(EE) 795C.4	3	-		2	3	2	-	-	-	-	-	-	-	-
CS(EE) 795C.5	3	-	-	2	3	2	-	-	-	-	-	-	-	-

Paper Name: Data Base Management System Laboratory
Paper Code: CS(EE) 795D

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CS(EE) 795D.1	2	2	2	2	3	1	-	-	-	2	-	2	-	-
CS(EE) 795D.2	2	3	3	3	3	1	-	-	-	2	-	2	-	-
CS(EE) 795D.3	3	3	2	3	3	2	-	-	-	3	-	3	-	-
CS(EE)795D.4	3	3	2	2	2	1	-	-	-	1	-	3	-	-
CS(EE)795D.5	3	-	-	2	3	2	-	-	-	-	-	-	-	-

Paper Name: Assigned Project -I
Paper Code: EE 781

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE781.1	3	3	3	3	3	3	2	2	3	3	3	3	3	3
EE781.2	3	3	3	3	3	3	2	2	3	3	3	3	3	3
EE781.3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
EE781.4	3	3	3	3	3	3	2	2	3	3	3	3	3	3

Paper Name Entrepreneurship Development
Paper Code: EE MC781

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
MC 781.1	3	-	-	-	-	3	-	-	-	-	-	-	-	-
MC 781.2	3	3	-	-	-	-	-	-	-	-	3	-	-	-
MC 781.3	3	3	-	-	-	-	-	-	-	-	3	-	-	-
MC 781.4	3	-	-	-	-	3	-	-	3	-	3	-	-	-
MC 781.5	3	-	-	-	-	-	-	-	-	-	-	-	-	-

B.Tech Eighth Semester Curriculum

Sl. No.	PaperCode	Course Name	Contact Hours/Week				Credit Points
			L	T	P	Total	
1	HU 805	Industrial and Financial Management	2	0	0	2	2
2	EE 801	A. HVDC Transmission B. Energy Management and Audit C. Power Plant Engineering	3	0	0	3	3
3	EE 802	A. Sensors and Transducers B. Process Control and Instrumentation C. Electronic Instrumentation and Control	3	1	0	4	4
Total of Theory						**09**	**09**
B. PRACTICAL							
7	EE 881	Project and Thesis	0	0	12	12	6
8	EE 871	Grand Viva	0	0	0	0	3
Total of Practical						12	09
Total of Theory and Practical						21	18

Paper Name: HVDC Transmission
Paper Code: EE 801A

COs	Statement
EE 801A.1	Acquire knowledge of HVDC transmission and HVDC converters and the applicability and advantage of HVDC transmission over conventional AC transmission.
EE 801A.2	Formulate and solve mathematical problems related to rectifier and inverter control methods and learn about different control schemes as well as starting and stopping of DC links.
EE 801A.3	Analyze the different harmonics generated by the converters and their variation with the change in firing angles.
EE 801A.4	Study and understand the nature of faults happening on both the AC and DC sides of the converters and formulate protection schemes for the same.
EE 801A.5	Understand the existing HVDC systems along with MTDC systems and modern transmission system.

Paper Name: Energy Management and Audit
Paper Code: EE 801B

COs	Statement
EE 801B.1	Identify the demand supply gap of energy in Indian scenario.
EE 801B.2	Carry out energy audit of an industry/Organization.
EE 801B.3	Draw the energy flow diagram of an industry and identify the energy waste do rawest stream.
EE 801B.4	Select appropriate energy conservation method to reduce the wastage of energy.
EE 801B.5	Evaluatethetechnoeconomicfeasibilityoftheenergyconservationtechniqueadopted

Paper Name: Power Plant Engineering
Paper Code: EE 801C

COs	Statement
EE 801C.1	Understand the principles of operation for different power plants.
EE 801C.2	Understand the economics of operation for different power plants.
EE 801C.3	Analyse the interconnection between different power plants.

Paper Name: Sensors and Transducers
Paper Code: EE 802A

COs	Statement
EE 802A.1	Students should be able to illustrate the fundamental principles of various types of sensors.
EE 802A.2	Students should be able to compare the different types of transducers available.
EE 802A.3	Students should be familiar with criteria to recommend appropriate sensors to perform engineering tasks and scientific researches.
EE 802A.4	Students will be able to understand the design of different Sensors.

Paper Name: Process Control and Instrumentation
Paper Code: EE 802B

COs	Statement
EE 802B.1	Design controller by applying the knowledge of different control action
EE 802B.2	Calculate controller parameters by applying different tuning methods.
EE 802B.3	Describe different advanced control strategy
EE 802B.4	State the operation and use of final control element
EE 802B.5	Develop ladder diagram

Paper Name: Electronic Instrumentation and Control
Paper Code: EE 802C

COs	Statement
EE802C.1	Demonstrate thermal power plant and its instrumentations.
EE802C.2	Apply the knowledge of control for different components of a power plant.

Paper Name: Industrial and Financial Management
Paper Code: HU 805

COs	Statement
HU 805.1	Student will be able to demonstrate the applicability of financial management in industryto understand the managerial decisions and corporate capital structure
HU 805.2	Student will be able to analyse the complexities associated with industrial management.
HU 805.3	Student will be able to demonstrate how risk is assessed

Paper Name: Project and Thesis
Paper Code: EE 881

COs	Statement
EE 881.1	Undertake problem identification, formulation and solution.
EE 881.2	Design engineering solutions to complex problems utilizing a systems approach
EE 881.3	Communicate with engineers and the community at large in written an oral forms.
EE 881.4	Demonstrate the knowledge, skills and attitudes of a professional engineer.

CO-PO/PSO mapping

Paper Name: HVDC Transmission
Paper Code: EE 801A

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 801A.1	-	-	-	-	-	-	-	-	-	-	-	-	2	2
EE 801A.2	2	2	-	-	-	-	-	-	-	-	-	-	2	1
EE 801A.3	2	3	1	-	-	-	-	-	-	-	-	-	2	2
EE 801A.4	-	-	2	-	1	-	-	-	-	-	-	-	2	2

Paper Name: Energy Management and Audit
Paper Code: EE 801B

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 801B.1	3	-	-	3	2		-	-	-	-	-	-	-	-
EE 801B.2	2	-	-	-	2	3	-	-	-	-	-	-	-	-
EE 801B.3	3	-	-	-	3		-	-	-	-	-	-	-	-
EE 801B.4	2	3	2		2		-	-	-	-	-	-	3	
EE 801B.5	3	-	-	-	-	-	3	-	-	-	-	-		3

Paper Name: Sensors and Transducers
Paper Code: EE 802A

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 802A.1	3	-	-	-	3	2	-	-	-	-	-	-	-	-
EE 802A.2	3	-	-	-	3	3	-	-	-	-	-	-	-	-
EE 802A.3	-	-	-	3	3	2	-	-	-	-	-	-	-	-
EE 802A.4	-	-	3		3	2	-	-	-	-	-	-	3	-

Paper Name: Industrial and Financial Management
Paper Code: HU805

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
HU805.1	-	-	-	-	-	3	-	-	3	-	3	-	-	3
HU805.2	-	-	-	-	-		-	3	-	3	-	3	-	-
HU805.3	-	-	-	-	-	3	-	-	3	-	3	-	-	3

Paper Name: Project and Thesis
Paper Code: EE 881

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 881.1	-	-	3	3	-	3	-	3	-	3	3	-	3	3
EE 881.2	3	3	-	-	3	3	3	3	3	3	3	3	-	3
EE 881.3	-	3	3	3	3	-	3	3	3	3	3	3	3	-
EE 881.4	3	-	-	3	3	3	3	-	-	-	-	3	-	3

Paper Name: Grand Viva
Paper Code: EE 871

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EE 871.1	3	3	-	-	-	-	3	-	-	3	-	3	-	3
EE 871.2	3	3	-	3	-	-	3	-	3	3	-	3	3	3
EE 871.3	-	3	-	3	-	-	3	-	3	-	-	-	-	-

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