R-21

CURRICULUM ESSENTIALS

Handbook on Outcome Based Education

ELECTRONICS & COMMUNICATION 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 develop self-motivated, creative & Ethical Skilled Engineers and Researchers to meet the Social Commitment.

Department Mission

DM1: To impart State-of-Art Technical Education.
DM2: To encourage the students for professional ethics & social responsibilities.

DM3: To inculcate team work & leadership qualities to make the students industry ready & employable.

DM4: To carry out research leading to the realization of knowledge and intellectual property.

DM5: To facilitate graduates to become an entrepreneur.

Program Educational Objectives (PEOs)

PEO1: Graduates will be able to pursue their professional careers independently and in a team in Electronics & Communication Engineering and relevants for local & global needs.

PEO2: Graduates will be able to pursue their higher study, research work in the multidisciplinary area, and upgrade their professional skills.

PEO3: Graduates will be able to identify & formulate and apply professional skills & ethics to solve societal & environmental issues.

PEO4: Graduates will be able to communicate efficiently while working as a member or leader in a group and as an entrepreneur.

Program Specific Outcomes (PSOs)

PSO1: Ability to Identify, Formulate & Solve problems of basics of Electronics & Communication Engineering and to apply them to various areas like Analog & digital Circuits, Signal & systems, Communication, VLSI, Embedded System etc.

PSO2: Ability to design the systems of Electronics & Communication Engineering using advanced hardware and software tools with analytical skills to achieve the Societal needs.

PSO3: Based on the knowledge of Electronics & Communication Engineering, social & environmental awareness along with ethical responsibility able to build a successful career that addresses the real-world applications as a researcher & as an entrepreneur.

Program outcomes (POs)

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

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L – Lecture; T- Tutorial; P- Practical [1L=1Cr, 1T=1Cr, 1P =0.5 Cr]

First Year First Semester

Sl.No	Category	Course Code	Course Title	Hours per week				Credits
	A. THEORY			L	T	P	Total	
1	Basic Science course	CH101	Chemistry-I	3	0	0	3	3
2	Basic Science course	M101	Mathematics –I	4	0	0	4	4
3	Engineering ScienceCourses	EE101	Basic Electrical Engineering	3	0	0	3	3
4	Humanities and SocialSciences including Management courses	HSMC 101	Professional Communication	2	0	0	2	2
	B. PRACTICAL							
5	Basic Science course	CH191	Chemistry-I Lab	0	0	3	3	1.5
6	Engineering ScienceCourses	EE 191	Basic Electrical Engineering Lab	0	0	3	3	1.5
7	Engineering ScienceCourses	ME 192	Engineering Graphics & Design Lab	0	0	3	3	1.5
8	PROJECT	PR191	Theme based Project I	0	0	1	1	0.5
9	PROJECT	PR192	Skill Development I: Soft Skill	0	0	1	1	0.5
	C. MANDATORY ACTIVITIES / COURSES							
10	Mandatory Course	MC181	Induction Program	0	0	0	0	2Units
	TOTAL CREDIT							17.5

First Year 2nd Semester

Sl.No.	Category	Course Code	Course Title	Hours per week				Credits
	A. THEORY			L	T	P	Total	
1	Basic Science courses	PH 201	Physics-I	3	0	0	3	3
2	Basic Science courses	M 201	Mathematics –II	4	0	0	4	4
3	Engineering Science Courses	CS 201	Programming for Problem Solving	3	0	0	3	3
	B. PRACTICAL							
4	Basic Science course	PH 291	Physics-I Lab	0	0	3	3	1.5
5	Humanities and SocialSciences including Management courses	HSMC 291	Professional Communication LAB	0	0	3	3	1
6	Engineering ScienceCourses	ME 291	Workshop & Manufacturing Practices Lab	0	0	3	3	1.5
7	Engineering ScienceCourses	CS 291	Programming for Problem Solving Lab	0	0	3	3	1.5
8	PROJECT	PR291	Theme based Project II	0	0	1	1	0.5
9	PROJECT	PR292	Skill Development II: Life Skill	1	0	0	1	0.5
	C. MANDATORY ACTIVITIES / COURSES							
10	Mandatory Course	MC281	NSS/ Physical Activities / Meditation & Yoga / Photography/ Nature Club	0	0	3	3	3 Units
	TOTAL CREDIT							16.5

Second Year 1st Semester(3rd Semester)

Sl.No.	Category	Course Code	Course Title	Hours per week				Credits/ Unit
				L	T	P	Total	
A. THEORY								
1	BS	M 301	Mathematics III	3	0	0	3	3
2	ES	EC 301	Data Structure	3	0	0	3	3
3	ES	EC302	Circuit Theory & Network	3	0	0	3	3
4	PC	EC303	Electronic Devices	3	0	0	3	3
5	PC	EC304	Signal & Systems	3	0	0	3	3
6	HSMC	HSMC 303	Universal Human Values 2: Understanding Harmony	3	0	0	3	3
B. PRACTICAL								
7	ES	M (CS)391	Numerical Methods Lab	1	0	3	3	2.5
8	ES	EC391	Data Structure Lab	0	0	3	3	1.5
9	ES	EC392	Circuit Theory & Network Lab	0	0	3	3	1.5
10	PC	EC393	Electronic Devices Lab	0	0	3	3	1.5
11	PROJECT	PR391	Theme based Project III	0	0	1	1	0.5
12	PROJECT	PR392	Skill Development III: TechnicalSeminar Presentation	0	0	1	1	0.5
C. MANDATORY ACTIVITIES / COURSES								
13	MC	MC 301	Environmental Science	3	0	0	3	0
	TOTAL CREDIT WITHOUT MOOCS COURSES							26.0
D.MOOCS COURSES**								
14	MOOCS COURSES	HM301	MOOCS COURSE-II	1	3	1	4	4
TOTAL CREDIT WITH MOOCS COURSES								**30**

**** MOOCS COURSES for HONOURS/MINOR Degree are Program specific and tobe taken fromMOOCS BASKET**

Second Year 2nd Semester(4th Semester)

Sl.No.	Category	Course Code	Course Title	Hours per week				Credits /Unit
				L	T	P	Total	
A. THEORY								
1	PC	EC401	EM Theory & Antenna	3	0	0	3	3
2	PC	EC402	Analog Circuits	3	0	0	3	3
3	PC	EC403	Digital Electronics	3	0	0	3	3
4	PC	EC404	Analog & Digital Communication	3	0	0	3	3
5	PC	EC405	Digital Signal Processing	3	0	0	3	3
6	HSMC	HSMC 402	Gender Culture and Development	2	0	0	2	2
B. PRACTICAL								
6	PC	EC491	EM Theory & Antenna Lab	0	0	3	3	1.5
7	PC	EC492	Analog Circuits Lab	0	0	3	3	1.5
8	PC	EC493	Digital Electronics Lab	0	0	3	3	1.5
9	PC	EC494	Analog & Digital Communication Lab	0	0	3	3	1.5
10	PC	EC495	Digital Signal Processing Lab	0	0	3	3	1.5
11	PROJECT	PR 491	Theme based Project IV	0	0	1	1	0.5
12	PROJECT	PR492	Skill Development IV:Soft Skill & Aptitude	0	0	1	1	0.5
C. MANDATORY ACTIVITIES / COURSES								
13	MC	MC 481	Learning an Art Form [vocal or instrumental, dance, painting, clay modeling, etc.] OR Environmental Protection Initiatives	0	0	3	3	0
	TOTAL CREDIT WITHOUT MOOCS COURSES							25.5
D.MOOCS COURSES								
14	MOOCS COURSES	HM401	MOOCS COURSE-III	3	1	0	4	4
TOTAL CREDIT WITH MOOCS COURSES (FOR CSE, ECE, EE, EIE**)**								**29.5**

**** MOOCS COURSES for HONOURS/MINOR Degree are Program specific and tobe taken fromMOOCS BASKET**

Third Year 1st Semester(5th Semester)

Sl.No.	Category	Course Code	Course Title	Hours per week				Credits /Unit
				L	T	P	Total	
A. THEORY								
1	HSMC	HSMC 505	Principles of Management	2	0	0	2	2
2	PC	EC501	Microprocessor & Micro Controller	3	0	0	3	3
3	PC	EC502	RF & Microwave Engineering	3	0	0	3	3
4	PC	EC503	Computer Network	3	0	0	3	3
5	PE	PEC 501	Professional Elective-I A: Mobile Communication & NetworkB: Fiber Optic Communication C: Electronics Measurement &Instrumentation D: Satellite Communication	3	0	0	3	3
6	PE	PEC 502	Professional Elective-II A: Computer Architecture B: Digital Image & Video ProcessingC: Embedded System D: Advanced Python Programming	3	0	0	3	3
B. PRACTICAL								
7	PC	EC591	Microprocessor & Micro Controller Lab	0	0	3	3	1.5
8	PC	EC592	RF & Microwave Engineering Lab	0	0	3	3	1.5
9	PE	PEC 591	Professional Elective-I Lab A: Mobile Communication & Network LabB: Fiber Optic Communication Lab C: Electronics Measurement & InstrumentationLab D: Satellite Communication Lab	0	0	3	3	1.5
10	PE	PEC 592	Professional Elective-II Lab A: Computer Architecture Lab B: Digital Image & Video Processing LabC: Embedded System Lab D: Advanced Python Programming Lab	0	0	3	3	1.5
11	PROJECT	PR 591	Minor Project I	0	0	3	2	1
12	PROJECT	PR 592	Skill Development V: Soft Skill & Aptitude-II	0	0	1	1	0.5
C. MANDATORY ACTIVITIES / COURSES								
13	MC	MC 501	Constitution of India	2	0	0	2	0
	TOTAL CREDIT WITHOUT MOOCS COURSES							24.5
D. MOOCS COURSES [For Honors/Minor]**								
14	MOOCS COURSES	HM501	MOOCS COURSE-IV	3	1	0	4	4
TOTAL CREDIT WITH MOOCS COURSES								**28.5**

**** MOOCS COURSES for HONOURS/MINOR Degree are Program specific and tobe taken fromMOOCS BASKET**

Third Year 2nd Semester(6th Semester)

Sl.No.	Category	Course Code	Course Title	Hours per week				Credits /Unit
				L	T	P	Total	
A. THEORY								
1	HSMC	HSMC 604	Economics for Engineers	2	0	0	2	2
2	PC	EC601	VLSI & Microelectronics	3	0	0	3	3
3	PC	EC602	Control System	3	0	0	3	3
4	PE	PEC602	Professional Elective-III A: Information Theory & Coding B: Renewable Energy Sources & ApplicationsC: Nano Technology D: Remote Sensing & GIS	3	0	0	3	3
5	OE	OEC 601	Open Elective-I A: Object Oriented Programming using JAVA.B: Fundamentals of Sensors & Transducers C: Introduction to Quantum ComputingD: Fundamentals of Operating System	3	0	0	3	3
6	OE	OEC 602	Open Elective-II A: Database Management SystemB: 3D Printing and Design C: Web Intelligence & Big DataD: Scientific Computing	3	0	0	3	3
B. PRACTICAL								
7	PC	EC691	VLSI & Microelectronics Lab	0	0	3	3	1.5
8	PC	EC692	Control System Lab	0	0	3	3	1.5
9	OE	OEC 691	Open Elective-I Lab A: Object Oriented Programming usingJAVA Lab B: Fundamentals of Sensors & TransducersLab C: Quantum Computing Lab D: Fundamentals of Operating System Lab	0	0	3	3	1.5
10	OE	OEC 692	Open Elective-II Lab A: Database Management System LabB: 3D Printing and Design Lab C: Web Intelligence & Big Data LabD: Scientific Computing Lab	0	0	3	3	1.5
11	PROJECT	PR 691	Minor Project II	0	0	3	2	1
12	PROJECT	PR 692	Skill Development VI: Soft Skill &Aptitude-III	0	0	1	1	0.5
C. MANDATORY ACTIVITIES / COURSES								
13	MC	MC 601	Intellectual Property Right	2	0	0	2	0
	TOTAL CREDIT WITHOUT MOOCS COURSES							24.5
D.MOOCS COURSES**								
14	MOOCS COURSES	HM601	MOOCS COURSE-V	3	1	0	4	4
TOTAL CREDIT WITH MOOCS COURSES								**28.5**

**** MOOCS COURSES for HONOURS/MINOR Degree are Program specific and tobe taken fromMOOCS BASKET**

Fourth Year 1st Semester(7th Semester)

Sl.No	Course Code	Paper Code	Theory	Contact Hours /Week				Credits/Unit
				L	T	P	Total	
A. THEORY								
1	PE	PEC701	Professional Elective-IV A: Internet of Things B: Artificial Intelligence C: Digital Control System D: Cloud Computing (AWS)	3	0	0	3	3
2	PE	PEC702	Professional Elective-V A: Biomedical Electronics & Imaging B: Introduction to EDA tool C: Radar & Missile Communication D: Introduction to MEMS	3	0	0	3	3
4	OE	OEC 702	Open Elective-III A: Data Science B: Machine Learning C: Cyber Security & Cryptography D: Advanced Bio Signal Processing E: Mixed signal Design	3	0	0	3	3
B. PRACTICAL								
5	PE	PEC 791	Professional Elective-IV lab A: Internet of Things Lab B: Artificial Intelligence Lab C: Digital Control System Lab D: Cloud Computing (AWS) Lab	0	0	0	3	1.5
6	OE	OEC 792	Open Elective-III Lab A: Data Science Lab B: Machine Learning Lab C: Cyber Security & Cryptography Lab D: Advanced Bio Signal Processing Lab E: Mixed signal Design Lab	0	0	3	3	1.5
7	PROJECT	PR 791	Major Project-I	0	0	0	4	2
8	PROJECT	PR 792	Skill Development VII: Seminar & Group Discussion	0	0	1	1	0.5
9	PROJECT	PR 793	Industrial Training / Internship	0	0	0	0	1
C. MANDATORY ACTIVITIES / COURSES								
10	MC	MC 701	Entrepreneurship & Innovation Skill	2	0	0	2	0
TOTAL CREDIT WITHOUT MOOCS COURSES								15.5
D.MOOCS COURSES**								
11	MOOCS COURSES	HM701	MOOCS COURSE-VI	3	1	0	4	4
TOTAL CREDIT WITH MOOCS COURSES								**19.5**

*Collective Data from 3rd to 6th Semester (Summer/Winter Training during SemesterBreak & Internship should bedoneafter 5th Semester or 6th Semester). All related **certificates to be collected by the training/internship coordinator(s).**

**** MOOCS COURSES for HONOURS/MINOR Degree are Program specific and to be taken from MOOCS BASKET**

Fourth Year 2nd Semester(8th Semester)

Sl.No	Course Code	Paper Code	Theory	Contact Hours /Week				Credits /Unit
				L	T	P	Total	
A. THEORY								
1	PE	PEC801	Professional Elective-VI A: Industrial Automation & Robotics B: Electronic System Design C: Automotive Electronics D: Adaptive Signal Processing	3	0	0	3	3
2	OE	OEC801	Open Elective-IV A: Block Chain B: Deep Learning C: Biology for Engineers D: Foreign Language E: Product Design & Manufacturing Processes F: Business Research Method	3	0	0	3	3
B. PRACTICAL								
4	PROJECT	PR 891	Major Project-II	0	0	0	12	6
5	PROJECT	PR 892	Grand Viva	0	0	0	0	1
C. MANDATORY ACTIVITIES / COURSES								
6	MC	MC 801	Essence of Indian Knowledge Tradition	3	0	0	3	0
TOTAL CREDIT								13

Total FOR ECE		
Semester	**Without MOOCS**	**With MOOCS**
I	**13**	**13**
II	**21**	**21**
III	**26**	**30**
IV	**25.5**	**29.5**
V	**24.5**	**28.5**
VI	**24.5**	**28.5**
VII	**15.5**	**19.5**
VIII	**13.0**	**13**
Total:	**163**	**183 (for Honors/minor)**

Professional Electives (It is expected Options in a vertical column would lead to expertise in a specific/allied domain)				
	Option 1	**Option 2**	**Option 3**	**Option 4**
Professional Elective I (With Lab)	A: Mobile Communication & Network	B: Fibre Optic Communication	C: Electronics Measurement & Instrumentation	D: Satellite Communication
Professional Elective II (With Lab)	A: Advanced Microprocessor & Microcontroller	B: Digital Image & Video Processing	C: Embedded System	D: Python Programming
Professional Elective III (Without Lab)	A: Information Theory & Coding	B: Renewable Energy Sources & Applications	C: Nano Technology	D: Remote Sensing & GIS
Professional Elective IV (With Lab)	A: Internet of Things	B: Artificial Intelligence	C: Digital Control System	D: Cloud Computing (AWS)
Professional Elective V (Without Lab)	A: Biomedical Electronics & Imaging	B: Physical Design, Verification & Testing	C: Radar & Missile Communication	D: Introduction to MEMS
Professional Elective VI (Without Lab)	A: Industrial Automation & Robotics	B: Electronic System Design	C: Automotive Electronics	D: Adaptive Signal Processing

Open Electives (It is expected Options in a vertical column would lead to expertise in a specific/allied domain)				
	Option 1	**Option 2**	**Option 3**	**Option 4**
Open Elective I (With Lab)	A: Object Oriented Programming using JAVA.	B: Fundamentals of Sensors & Transducers	C: Quantum Computing	D: Fundamentals of Operating System
Open Elective II (With Lab)	A: Database Management System	B: 3D Printing and Design	C: Intelligent wave & Big Data	D: Scientific Computing
Open Elective III (With Lab)	A: Data Science	B: Machine Learning	C: Cyber Security & Cryptography	D: Advanced Bio Signal Processing E: Computer Architecture
Open Elective IV (Without Lab)	A: Block Chain	B: Probability & Stochastic Process	C: Biology for Engineers	D: Foreign Language E. Product Design & Manufacturing Processes F: Business Research Method

MOOCs (It is expected Options in a vertical column would lead to expertise in a specific/allied domain)						
	Sem	Credit	Option 1	Option 2	Option 3	Option 4
MOOCS COURSE-I	I I	2	Course related to MAR			
MOOCS COURSE-II	III	4	Related to Minor/Honors	Related to Minor/Honors	Related to Minor/Honors	Related to Minor/Honors
MOOCS COURSE-III	IV	4	Related to Minor/Honors	Related to Minor/Honors	Related to Minor/Honors	Related to Minor/Honors
MOOCS COUR SE-IV	V	4	Related to Minor/Honors	Related to Minor/Honors	Related to Minor/Honors	Related to Minor/Honors
MOOCS COUR SE-V	VI	4	Related to Minor/Honors	Related to Minor/Honors	Related to Minor/Honors	Related to Minor/Honors
MOOCS COUR SE-VI	VII	4	Related to Minor/Honors	Related to Minor/Honors	Related to Minor/Honors	Related to Minor/Honors

COURSE NAME:CHEMISTRY
COURSE CODE: CH 101
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36
CREDITS: 3

After completion of the course students would be able to

CO1	Describe the fundamental properties of atoms & molecules, atomic structure and the periodicity of elements in the periodic table
CO2	Apply fundamental concepts of thermodynamics in different engineering applications.
CO3	Apply the knowledge of water quality parameters, corrosion control & polymers to different industries.
CO4	Determine the structure of organic molecules using different spectroscopic techniques.
CO5	Evaluate theoretical and practical aspects relating to the transfer of the production of chemical products from laboratories to the industrial scale, in accordance with environmental considerations.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	-	-	-	-	2	2	2	2
CO2	3	3	3	3	-	-	-	-	2	2	2	3
CO3	3	3	2	2	-	2	2	-	2	-	3	3
CO4	3	2	3	2	-	-	2	-	2	2	3	3
CO5	3	3	3	3	2	2	2	-	2	-	2	3

CO-PSO Mapping

COs	PSO 1	PSO 2	PSO 3
CH101.1	-	-	2
CH101.2	-	-	2
CH101.3	-	-	2
CH101.4	-	-	2
CH101.5	-	-	2

COURSE NAME: MATHEMATICS-I
COURSE CODE: M 101
CONTACT: 4:0:0
TOTAL CONTACT
HOURS: 48 CREDITS: 4

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After completion of the course students would be able to

CO1	Recall the properties and formula related to matrix algebra, differential calculus, multivariable calculus, vector calculus and infinite series.
CO2	Determine the solutions of the problems related to matrix algebra, differential calculus, multivariable calculus, vector calculus and infinite series.
CO3	Apply the appropriate mathematical tools of matrix algebra, differential calculus, multivariable calculus, vector calculus and infinite series for the solutions of the problems
CO4	Analyze different engineering problems linked with matrix algebra, differential calculus, multivariable calculus, vector calculus.
CO5	Apply different engineering problems linked with matrix algebra, differential calculus, Integra Calculus, multivariable calculus, vector calculus.

CO-PO Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	2
CO2	3	2	-	-	-	-	-	-	-	-	-	2
CO3	3	2	2	-	-	-	-	-	-	-	-	2
CO4	2	3	2	2	-	-	-	-	-	-	-	2

CO-PSO Mapping

COs	**PSO 1**	**PSO 2**	**PSO 3**
M101.1	2	2	2
M101.2	2	2	2
M101.3	2	2	2
M101.4	2	2	2
M101.5	2	2	2

COURSE NAME: BASIC ELECTRICAL ENGINEERING
COURSE CODE: EE101
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36
CREDITS: 3

At the end of this course, students will able

CO1	understand and analyze basic electric circuits
CO2	study the working principles of electrical machines.
CO3	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.
CO4	Understand the single phase transformer using EMF equation, No Load no load and on load operation, phasor diagram and equivalent circuit, losses of a transformer.
CO5	Understand 3-phase induction motor using Slip and Frequency ,rotor emf and current, Equivalent circuit and phasor diagram, Torque Slip characteristics torque-speed characteristics Starting of induction motor by star delta starter.

CO-PO mapping

COs	**PO 1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
EE 101.1	3	3	3	-	-	3	-	-	3	-	2	3
EE 101.2	3	3	2	-	-	2	-	-	3	-	1	3
EE 101.3	3	3	3	-	-	1	-	-	3	-	1	3
EE 101.4	3	3	3	-	-	2	-	-	3	-	2	3
EE 101.5	3	3	3	-	-	2	-	-	3	-	2	3

CO-PSO mapping

COs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	**3**	**3**	**-**
EE 101.2	**3**	**3**	**-**
EE 101.3	**3**	**3**	**-**
EE 101.4	**3**	**3**	**-**
EE 101.5	**3**	**3**	**-**

COURSE NAME: PROFESSIONAL COMMUNICATION
COURSE CODE: HSMC 101
CONTACT: 2:0:0
TOTAL CONTACT HOURS: 24
CREDITS: 2

At the end of this course, students will able

CO1	apply the modalities and nuances of communication in a workplace context.
CO2	analyze communication across cultures and societies.
CO3	apply the basic formats, templates of business and official communication..
CO4	employ formal communication modes in meetings and reports.
CO5	justify importance of culturally neutral language in interpersonal and business communication.

CO-PO mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	2	-	-	3	-	2
CO2	2	3	2	-	-	2	2	2	-	3	-	3
CO3	2	3	-	-	-	3	3	3	-	3	-	3
CO4	-	-	-	-	-	3	3	3	-	3	-	3
CO5	-	-	-	-	-	-	3	3	-	3	-	3

CO-PSO Mapping

COs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	-	-	2
CO2	-	-	2
CO3	-	-	2
CO4	-	-	2
CO5	-	-	2

COURSE NAME:
CHEMISTRY-I LABCOURSE
CODE: CH 191
CONTACT: 0:0:3
CREDITs: 1.5

At the end of this course, students will able

CO1	Able to operate different types of instruments for estimation of small quantities chemicals used in industries and scientific and technical fields.
CO2	Able to analyze and determine the composition of liquid and solid samples working as anindividual and also as a team member.
CO3	Able to analyze different parameters of water considering environmental issues.
CO4	Able to synthesize drug and polymer materials.
CO5	Capable to design innovative experiments applying the fundamentals of chemistry.

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CH191.1	2	2	3	2	-	2	-	-	-	-	-	2
CH191.2	2	2	3	2	-	2	-	-	-	-	-	2
CH191.3	2	2	3	2	-	2	-	-	-	-	-	2
CH191.4	2	2	3	2	-	2	-	-	-	-	-	2
CH191.5	3	3	3	3	-	2	-	-	-	-	-	2

CO-PSO Mapping

COs	PSO 1	PSO 2	PSO 3
HU191.1	-	-	2
HU191.2	-	-	2
HU191.3	-	-	2
HU191.4	-	-	2
HU191.5	-	-	2

COURSE NAME: BASIC ELECTRICAL ENGINEERING LABORATORY
COURSE CODE: EE191
CONTACT: 0:0:3
CREDITS: 1.5

Course Outcomes (COs):

After completion of the course students would be able to

CO1	Identify common electrical components and their ratings.
CO2	Make Circuit connection by wires of appropriate ratings.
CO3	Understand the basic characteristics of transformers and electrical machines.
CO4	Design Open circuit and short circuit test of a single phase Transformer
CO5	Design DC shunt motor and analyse single phase Energy Meter

CO-PO mapping

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

CO-PSO Mapping

COs	**PSO 1**	**PSO 2**	**PSO 3**
EE 191.1	3	3	-
EE 191.2	3	3	-
EE 191.3	3	3	-
EE 191.4	3	3	-
EE 191.5	3	3	-

COURSE NAME: ENGINEERING GRAPHICS & DESIGN COURSE
CODE: ME192
CONTACT: 0:0:3
CREDITS: 1.5

Course Outcomes (COs):

After completion of the course students would be able to

CO1	Get introduced with Engineering Graphics and visual aspects of design.
CO2	Know and use common drafting tools with the knowledge of drafting standards.
CO3	Able to apply computer aided drafting techniques to represent line, surface or solid models indifferent Engineering viewpoints.
CO4	Able to produce part models; carry out assembly operation and show working procedure of adesigned project work using animation.

CO-PO mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	2	2	2	2	-	2	2	2	2
CO2	2	2	3	2	2	2	2	2	2	2	2	2
CO3	2	2	3	2	3	2	2	-	2	2	2	3
CO4	2	2	3	3	3	3	2	2	3	3	2	2

COs	PSO 1	PSO 2	PSO 3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-

PAPER NAME: PHYSICS –I
PAPER CODE: PH 201
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36
CREDIT: 3

Course Outcomes (COs):

After completion of the course students would be able to

CO1	Describe different types of mechanical resonance and its electrical equivalence
CO2	Explain basic principles of Laser, Optical fibers and Polarization of light
CO3	Apply superposition principle to explain the phenomena of interference and diffraction
CO4	Analyze different crystallographic structures according to their co-ordination number and packing factors
CO5	Determine and justify the need of a quantum mechanics as remedy to overcome limitations imposed by classical physics

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PH201.1	3	3	2	2	-	-	-	-	-	-	-	-
PH201.2	3	3	2	2	-	-	-	-	-	-	-	-
PH201.3	3	3	2	2	-	-	-	-	-	-	-	-
PH201.4	3	3	2	2	-	-	-	-	-	-	-	-
PH201.5	3	3	2	2	-	-	-	-	-	-	-	-

CO-PSO Mapping

COs	PSO 1	PSO 2	PSO 3
PH201.1	3	2	2
PH201.2	3	2	2
PH201.3	3	2	2
PH201.4	3	2	2
PH201.5	3	2	2

COURSE NAME: MATHEMATICS-II
COURSE CODE: M 201
CONTACT: 4:0:0
TOTAL CONTACT HOURS: 48
CREDIT: 4

Course Outcomes (COs):

After completion of the course students would be able to

CO1	Determine and recall the properties and formula related to Ordinary differential equations, Basic Graph Theory and Laplace transform.
CO2	Determine the solutions of the problems related to Ordinary differential equations, Basic Graph Theory and Laplace transform.
CO3	Apply appropriate mathematical tools of Ordinary differential equations, Basic Graph Theory and Laplace transform.
CO4	Analyze engineering problems on Ordinary differential equations, Basic Graph Theory
CO5	Apply engineering solutions by using Laplace transform.

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	-	-	-	-	-	-	2
CO2	3	3	3	3	-	-	-	-	-	-	-	2
CO3	3	3	3	3	-	-	-	-	-	-	-	2
CO4	3	3	3	3	-	-	-	-	-	-	-	2
CO5	3	3	3	3	-	-	-	-	-	-	-	2

CO-PSO Mapping

COs	PSO 1	PSO 2	PSO 3
CO1	2	2	2
CO2	2	2	2
CO3	2	2	2
CO4	2	2	2
CO5	2	2	2

COURSE NAME: PROGRAMMING FOR PROBLEM SOLVING
COURSE CODE: CS 201
CONTACT: 3:0:0
TOTAL CONTACT HOURS: 36
CREDITS: 3

Course Outcomes (COs):

After completion of the course students would be able to

CO1	Understand the fundamental concept of Computer and mathematical knowledge and apply them in designing solution to engineering problem.
CO2	Understand the basic concept of C programming and use of data types/operators/input/output function for developing and implementing complete program leading to solution of mathematical and engineering problem.
CO3	Use conditional branching, iteration, recursion and formulate algorithms and programs in solving mathematical/ scientific/ engineering problem leading to lifelong learning.
CO4	Understand the concept of arrays, pointers, file and dynamic memory allocation and apply it for problem solving and also create new data types using structure, union and enum.
CO5	Understand how to decompose a problem into functions and assemble into a complete program by means of modular programming possibly as a team.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	-	-	-	-	-	-	-
CO2	2	2	3	2	-	-	-	-	-	-	-	-
CO3	2	3	2	2	-	-	-	-	-	-	-	3
CO4	3	2	2	2	3	-	-	-	-	-	-	-
CO5	2	2	2	2	-	-	-	-	3	2	-	-

CO-PSO Mapping

COs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

PAPER NAME: PHYSICS I LAB
PAPER CODE: PH 291
CONTACT HOURS: 0:0:3
CREDIT: 1.5

Course Outcomes (COs):

After completion of the course students would be able to

CO1	Demonstrate experiments allied to their theoretical concepts
CO2	Conduct experiments using LASER, Optical fiber, Torsional pendulum, Spectrometer
CO3	Analyze and participate as an individual and as a member or leader in groups in laboratory sessions actively.
CO4	Analyze experimental data from graphical representations, and to communicate effectively them in Laboratory reports including innovative experiments.
CO5	Develop critical thinking skills to solve for real life challenges.

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	3	3	-	-	-	-	-	-	-
CO2	2	3	2	3	3	-	-	-	-	-	-	-
CO3	2	3	2	3	3	-	-	-	-	-	-	-
CO4	2	3	2	3	3	-	-	-	-	-	-	-
CO5	2	3	2	3	2	-	-	-	-	-	-	-

CO-PSO mapping

COs/POs	PSO 1	PSO2	PSO3
CO1	3	3	2
CO2	3	3	2
CO3	3	3	2
CO4	3	3	2
CO5	3	3	2

COURSE NAME: PROFESSIONAL COMMUNICATION LAB
COURSE CODE: HSMC291
Contact: 0:0:2
CREDIT: 1

Course Outcomes (COs):

After completion of the course students would be able to

CO1	explain advanced skills of Technical Communication in English through Language Laboratory.
CO2	apply listening, speaking, reading and writing skills in societal and professional life.
CO3	demonstrate the skills necessary to be a competent Interpersonal communicator.
CO4	analyze communication behaviours.
CO5	adapt to multifarious socio-economical and professional arenas with the help of effective communication and interpersonal skills.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	2	-	-	3	-	2
CO2	2	3	2	-	-	2	2	2	-	3	-	3
CO3	2	3	-	-	-	3	3	3	-	3	-	3
CO4	-	-	-	-	-	3	3	3	-	3	-	3
CO5	-	-	-	-	-	-	3	3	-	3	-	3

CO-PSO mapping

COs/POs	PSO 1	PSO2	PSO3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-

COURSE NAME: WORKSHOP/MANUFACTURING PRACTICES
COURSE CODE: ME291
CONTACT: 0:0:3
CREDITS: 1.5

Course Outcomes (COs):

After completion of the course students would be able to

CO1	Identify and operate various hand tools related to variety of manufacturing operations
CO2	Safely fabricate simple components with their own hands.
CO3	Get practical knowledge of the dimensional accuracies and tolerances applicable for different manufacturing processes.
CO4	Produce small devices of their interest in project or research purpose.

CO-PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	-	2	3	2	-	2	2	2	3
CO2	2	2	3	2	2	2	2	-	3	2	2	3
CO3	3	2	2	2	2	2	2	2	2	2	2	3
CO4	2	2	3	2	3	3	2	-	3	3	3	3

CO-PSO mapping

COs/POs	PSO 1	PSO2	PSO3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-

COURSENAME: PROGRAMMING FOR PROBLEM SOLVING LAB
COURSE CODE: CS 291
CONTACT: 0:0:3
CREDITS: 1.5

Course Outcomes (COs):

After completion of the course students would be able to

CO1	Understand and propose appropriate command or function in running system or developing program for engineering and mathematical problems depending on the platform used even in changed environment leading to their lifelong learning.
CO2	Identify and propose appropriate data type, arithmetic operators, input/output functions and also conditional statements in designing effective programs to solve complex engineering problem using modern tools.
CO3	Design and develop effective programs for engineering and mathematical problems using iterative statements as well as recursive functions using modular programming approach possiblyas a team maintaining proper ethics of collaboration.
CO4	Explain and organize data in arrays, strings and structures and manipulate them through programs and also define pointers of different types and use them in defining self-referential structures and also to construct and use files for reading and writing to and from leading to solution of engineering and mathematical problem.
CO5	Prepare laboratory reports on interpretation of experimental results and analyze it for validating the same maintaining proper ethics of collaboration.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	-	-	-	-	3	-	-	3
CO2	3	3	3	2	-	-	-	-	3	-	-	3
CO3	3	3	3	2	-	-	-	-	3	-	-	3
CO4	3	3	3	2	-	-	-	-	3	-	-	3
CO5	2	3	3	3	-	-	-	-	3	-	-	3

CO-PSO mapping

COs/POs	PSO 1	PSO2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Mathematics-III
Course Code: M 301
Contact: 3:0:0
Total Contact Hours: 36
Credits: 3

On successful completion of the learning sessions of the course, the learner will be able to:

CO1	Recall the underlying principle and properties of Fourier series,Fourier transform,probability distribution of a random variable,calculus of complex variable,and partial differential equation.
CO2	Exemplify the variables,functions,probabilitydistributionanddifferentialequationsandfind their distinctive measures using the underlying concept of Fourier series, Fourier transform, probability distribution of a random variable, calculus of complex variable, and partial differential equation.
CO3	ApplyCauchy'sintegraltheoremandtheresiduetheoremtofindthevalueofcomplex integration, andcomputetheprobabilityofrealworlduncertainphenomenabyindentifying probability distribution that fits the phenomena.
CO4	Solve partial differential equation using method of separation of variables
CO5	FindtheFourierseriesandFouriertransformoffunctionsbyorganizingunderstandingsof underlying principles and also evaluate the integral using Parseval's identity.

CO- PO Mapping:

COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	-	-	-	-	-	-	-	-	1
CO2	3	2	1	-	-	-	-	-	-	-	-	1
CO3	3	2	2	-	-	-	-	-	-	-	-	1
CO4	3	2	2	-	-	-	-	-	-	-	-	1
CO5	3	3	2	3	-	-	-	-	-	-	-	1

CO-PSO mapping

COs/POs	PSO1	PSO2	PSO3
M 301.1	3	3	3
M 301.2	3	3	3
M 301.3	3	3	3
M 301.4	3	3	3
M 301.5	3	3	3

Course Name: Data Structure
Course Code: EC 301
Contact: 3:0:0
Total Contact Hours: 36
Credits: 3

On successful completion of the learning sessions of the course, the learner will be able to:

CO1	Able to understand the concept of linear and nonlinear data structures.
CO2	Able to evaluate the efficiency of algorithms.
CO3	Able to understand searching and sorting techniques
CO4	Able to illustrate the hashing technique.
CO5	Able to evaluate data using BFS, DFS, Prim's and Kruskal's algorithms.

CO-PO mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	-	-	-	-	2	-	-	2
CO2	3	3	3	3	-	-	-	-	2	-	-	3
CO3	3	3	3	2	-	-	-	-	2	-	-	3
CO4	3	3	3	3	-	-	-	-	2	-	-	3
CO5	3	3	3	3	-	-	-	-	2	-	-	2

PO-PSO mapping

COs/POs	PSO 1	PSO2	PSO 3
CO1	-	2	3
CO2	-	2	3
CO3	-	2	3
CO4	-	2	3
CO5	-	2	3

Course Name: Circuit Theory & Network
Course Code: EC 302
Contact: 3:0:0
Total Contact Hours: 36
Credits: 3

On successful completion of the learning sessions of the course, the learner will be able to:

CO1	Determine current, voltage and power at different branch/node for DC and AC circuit having independent & dependent sources with the help of various networks theorems and methods like nodal &mesh analysis and star-delta transformation.
CO2	Explain Laplace transform of step function, gate function, impulse function, triangular & rectangular function, stain of pulses, initial & final value theorem and able to apply the concept of Laplace transform to determine the circuit parameters in S-domain.
CO3	Determine and analyze circuit parameters of RC, RL and RLC network at transient conditions intime domain & S-domain with DC excitations and able to demonstrate transient behavior of RC, RL andRLC circuit with AC excitations
CO4	Construct and analyze performance of RLC series & parallel resonance circuit based on the parameters- resonance frequency, bandwidth, upper & lower cut-off frequency, quality factor and impedance at prototype level for audio frequency range.
CO5	Determine Z, Y, h & T parameters, analyze & develop two port equivalent circuit for an unknown DC and AC network with the concept of open& short circuit test.

CO-PO mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	-	-	-	-	2	-	-	2
CO2	3	3	3	3	-	-	-	-	-	-	-	3
CO3	3	3	3	2	-	-	-	-	-	-	-	3
CO4	3	3	3	3	-	-	-	-	-	-	-	3
CO5	3	3	3	3	-	-	-	-	2	-	-	2

PO-PSO mapping

COs/POs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	3	3	2
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Electronic Devices
Course Code: EC303
Contact: 3:0:0
Total Contact Hours: 36
Credits: 3

On successful completion of the learning sessions of the course, the learner will be able to:

CO1	Able to explain charge carrier transport phenomenon and generation-recombination process of intrinsic and extrinsic semiconductor materials with the help of energy banddiagram & Fermi-Dirac distribution function.
CO2	Able to illustrate electrical characteristics of rectifier diodes, Zener diode, varactor diode, PIN diode, Gunn diode, IMPATT diode, Tunnel diode, & LED based on properties of PN junction and understand the usages of solar cell as a renewable energy source for societal& environmental benefit.
CO3	Able to explain formation of Ohmic & non-Ohmic contact in metal semiconductor junction and 2D Electron Gas in Heterojunction based on energy band diagram.
CO4	Able to illustrate current flow mechanism, electrical characteristics, and electrical equivalent model of BJT with the help of energy band diagram at forward & reverse biased PN junction.
CO5	Able to determine drain current in linear & saturation region for JFET & MOSFET, MOS capacitances in accumulation, depletion & inversion stages, Pinch off voltage of JFET and threshold voltage of MOSFET with the help of mathematical expressions.

CO-PO Mapping

COs/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	-	-	-	-	2	-	-	2
CO2	3	3	3	3	-	-	2	-	2	-	-	3
CO3	3	3	2	3	-	-	-	-	2	-	-	3
CO4	3	2	3	2	-	-	-	-	2	-	-	2
CO5	3	3	3	3	-	-	-	-	2	-	-	3

CO-PSO Mapping

COs/Pos	PSO 1	PSO 2	PSO 3
CO1	2	2	2
CO2	2	2	2
CO3	2	2	2
CO4	3	2	2
CO5	2	2	2

Course Name: Signals & Systems
Course Code: EC 304
Contacts: 3:0:0
Total Contact Hours: 36
Credits: 3

On successful completion of the learning sessions of the course, the learner will be able to:

CO1	Identify different signals and systems and state their properties both in Continuous and discrete time domain.
CO2	Apply the concept of impulse response and perform convolution in both Continuous and discrete domain to analyze the LTI systems.
CO3	Compute spectral analysis of signals using Fourier series, Fourier transform, and Z-transform techniques.
CO4	Demonstrate the application of sampling theorem and concepts of random processes.
CO5	The graduates should learn mathematics, basic knowledge of differential equations and difference equations.

CO-PO mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	2	3	1	2	1	-	-	-	3
CO2	3	3	3	1	3	1	1	1	-	-	-	2
CO3	3	2	3	3	3	2	2	1	-	-	-	3
CO4	2	3	3	3	3	2	2	1	-	-	-	3
CO5	3	3	3	1	3	1	1	1	-	-	-	2

CO-PSO mapping

COs/POs	PSO1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Universal Human Values 2: Understanding Harmony
Course Code: HSMC 303
Contacts: 3:0:0
Total Contact Hours: 36
Credit: 3

On successful completion of the learning sessions of the course, the learner will be able to:

CO1	Develop holistic perspective based on self-exploration about themselves (human being), family,society and nature/existence.
CO2	Cultivate the harmony in the human being, family, society and nature/existence.
CO3	Strengthen self-reflection.
CO4	Build commitment and courage to act.

CO-PO mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	-	2	1	-	-	-	2	3	3	1	-	2
CO2	3	2	-	1	3	2	-	1	2	-	3	3	2	-	1
CO3	3	2	2	-	2	3	1	-	2	1	3	3	3	1	-
CO4	3	1	-	2	-	-	-	2	-	3	3	3	2	-	2

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Not matched.

PO-PSO mapping

COs/POs	PSO 1	PSO2	PSO 3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-

Course Name: Numerical Methods Lab
Course Code: M (CS) 391
Contact: 1:0:3
Credits: 2.5

On successful completion of the learning sessions of the course, the learner will be able to:

CO1	Understand the theoretical workings of numerical techniques with the help of C/ Matlab
CO2	Execute basic command and scripts in a mathematical programming language
CO3	Apply the programming skills to solve the problems using multiple numerical approaches.
CO4	Analyze if the results are reasonable, and then interpret and clearly communicate the results.

CO-PO mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	-	-	-	-	-	-	1
CO2	3	2	2	-	-	-	-	-	-	-	-	1
CO3	3	2	2	-	-	-	-	-	-	-	-	1
CO4	3	3	2	3	-	-	-	-	-	-	-	1

PO-PSO mapping

COs/POs	PSO 1	PSO2	PSO 3
CO1	2	2	2
CO2	2	2	2
CO3	2	2	2
CO4	2	2	2

Course Name: Data Structure Lab
Course Code: EC391
Contacts: 0:0:3
Credits: 1.5

On successful completion of the learning sessions of the course, the learner will be able to:

CO1	Understand the theoretical workings of numerical techniques with the help of C/ Matlab.
CO2	Execute basic command and scripts in a mathematical programming language.
CO3	Able to apply searching, sorting algorithms.
CO4	Able to apply graph theory and hash function.

CO-PO mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	3	2	2	3	3	3	2	3
CO2	3	2	2	2	2	2	3	2	2	3	3	2
CO3	3	3	3	2	3	3	3	2	2	3	3	2
CO4	3	1	3	2	2	1	2	2	3	1	-	2

CO-PSO mapping

COs/POs	PSO 1	PSO 2	PSO 3
CO1	-	2	3
CO2	-	2	3
CO3	-	2	3
CO4	-	2	3

Course Name: Circuit Theory and Networks Lab
Course Code: EC 392
Contact: 0:0:3
Credit: 1.5

Course Outcomes (COs):

CO1	Determine current, voltage and power in a DC and AC circuit with the help of network Theorems, Superposition theorem, Thevenin's & Norton's theorem, Maximum power transfertheorem, Compensation theorem and Millman's theorem.
CO2	Measure Z, Y, h & ABCD parameters of a two-port network following open circuit and short circuit test and conclude whether the network is symmetrical or reciprocal or both.
CO3	Construct RLC series & parallel resonance circuit and analyze its performance though the determination of resonance frequency, bandwidth, upper& lower cut-off frequency,quality factor and impedance at audio frequency range.
CO4	Estimate transient & steady state value of current & voltage in RC, RL & RLC circuitwith DC excitations range up to 25 V from the transient response curve.

CO-PO mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	3	-	-	2	3	3	2	3
CO2	3	3	3	2	3	-	-	2	3	3	2	3
CO3	3	3	3	2	3	-	-	2	3	3	2	3
CO4	3	3	3	2	3	-	-	2	3	3	2	3

CO-PSO mapping

COs/POs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Electronics Devices Lab
Course Code: EC 393
Contact: 0:0:3
Credits: 1.5

On successful completion of the learning sessions of the course, the learner will be able to:

CO1	Verify the working of different diodes, transistors, CRO probes and measuring instruments.Identifying the procedure of doing the experiment.
CO2	Understand the characteristics of BJT and FET and how to determine different parameters for designing purpose.
CO3	Understand properties of photoelectric devices
CO4	Measure and record the experimental data, analyze the results, and prepare a formal laboratory report

CO-PO mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	2	2	-	-	-	-	2	2
CO2	3	3	3	2	2	2	-	-	-	-	1	2
CO3	3	3	3	2	1	2	-	-	-	-	2	3
CO4	3	3	2	3	2	2	-	-	-	-	1	3

PO-PSO mapping

COs/POs	PSO1	PSO2	PSO3
CO1	2	2	2
CO2	2	2	2
CO3	2	2	2
CO4	2	2	2

Course Name: ENVIRONMENTAL SCIENCE
Course Code: MC 301
Contacts: 3:0:0
Total Contact Hours: 36
Credits: 0

On successful completion of the learning sessions of the course, the learner will be able to

CO1	Understand the natural environment and its relationships with human activities.
CO2	Apply the fundamental knowledge of science and engineering to assess environmental andhealth risk.
CO3	Develop guidelines and procedures for health and safety issues obeying the environmental lawsand regulations.
CO4	Acquire skills for scientific problem-solving related to air, water, noise & land pollution.

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	-	-	-	2	-	-	-	-	-	-
CO2	1	2	-	-	-	2	-	-	-	-	-	1
CO3	2	2	3	1	-	2	2	-	-	-	-	-
CO4	3	1	3	1	3	3	-	-	-	-	-	-

CO-PSO mapping

COs/POs	PSO1	PSO2	PSO3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-

Course Name: EM Theory & Antenna
Course Code: EC401
Contact: 3:0:0
Total Contact Hours: 36
Credits: 3

On successful completion of the learning sessions of the course, the learner will be able to:

CO1	Understand the knowledge of static fields and time-varying electromagnetic fields as governed by Maxwell's equations.
CO2	To understand in-depth study of transmission lines which play an important role in high-speed Digital design and signal integrity of PCBs.
CO3	To analyze the fundamentals of antenna theory.
CO4	Understand the different types of antennas and the radiation mechanism.

CO-PO Mapping:

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	1	2	1	-	-	2	1	2
CO2	3	3	3	2	2	1	1	-	-	1	2	1
CO3	3	2	3	2	-	1	1	-	-	3	2	2
CO4	2	2	3	3	2	1	-	-	-	3	2	1

CO-PSO mapping

COs/POs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Analog Circuits
Course Code: EC 402
Contact: 3:0:0
Total Contact Hours: 36
Credits: 3

On successful completion of the learning sessions of the course, the learner will be able to:

CO1	Studentswill be abletodesign,constructandanalyse transistor amplifier circuitinaudio frequency range with the help of h-parameter model.
CO2	Studentswill be able to understand conceptof feedback in amplifier andclassify amplifiers based on feedback topology.
CO3	Students will be able to design, construct and analyse signal generator circuit inboth audio frequency and radio frequency range using transistor.
CO4	Student will be able to design, construct and analyse power amplifier circuit inaudio frequency range.
CO5	Students will be able to design, construct and analyse linear and non linear electronic circuits using OPAMP (I.C-741).

CO-PO mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	-	2	-	3	1	-	2
CO2	3	3	3	3	2	-	2	-	3	-	1	3
CO3	3	2	3	3	2	-	2	-	3	-	-	3
CO4	3	3	3	3	2	-	2	-	3	1	-	3
CO5	3	3	3	3	2	-	3	-	3	-	1	3

CO-PSO mapping

COs/POs	PSO1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Digital Electronics
Course Code: EC 403
Contact: 3:0:0
Total Contact Hours: 36
Credits: 3

On successful completion of the learning sessions of the course, the learner will be able to:

CO1	Acquired knowledge about solving problems related to number systems conversionsand Boolean algebra and design logic circuits using logic gates to their simplest forms using DeMorgan's Theorems; Karnaugh Maps.
CO2	Design of combinational circuits and application
CO3	Design of various synchronous and asynchronous sequential circuits usingState Diagrams & Tables.
CO4	Understand DAC & ADC technique and corresponding circuits
CO5	Analyze logic family interfaces, switching circuits to Plan and execute projects.

CO-PO mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	1	3	1	1	1	1	1	1	3
CO2	3	3	3	1	3	1	1	1	1	1	1	3
CO3	3	3	3	3	3	2	2	1	1	1	2	3
CO4	3	3	3	3	3	2	2	1	1	2	1	3
CO5	3	3	3	3	3	1	2	1	2	2	2	3

CO-PSO mapping

COs/POs	PSO 1	PSO 2	PSO 3
CO1	3	3	2
CO2	3	3	2
CO3	3	3	2
CO4	3	3	2
CO5	3	3	2

Course Name: Analog & Digital Communication
Course Code: EC 404
Contact: 3:0:0
Total Contact Hours: 36
Credit: 3

Course Outcome
On completion of the course students will be

CO1	Explain the importance, Signal to Noise ratio, efficiency, and Bandwidth, of Amplitude modulation and demodulation schemes.
CO2	Analyse signal vector representation of various digitally modulated signalsby creating signal constellation.
CO3	Demonstrate the concepts of sampling, Pulse Modulation techniques and their comparison.
CO4	Design Optimum (Matched) filter, demonstrate the effects of Inter Symbol Interference(ISI)
CO5	Illustrate various types of coherent and non-coherent digital modulation techniques, analyse immunity parameters and calculate their error probabilities

CO-PO mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	-	3	1	1	1	1	1	1	3
CO2	3	3	3	1	3	1	1	-	1	-	1	3
CO3	3	3	3	-	3	2	2	1	-	1	2	3
CO4	3	3	3	-	3	2	2	1	1	2	1	-
CO5	3	3	3	3	3	1	2	1	2	2	2	3

CO-PSO mapping

COs/POs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Digital Signal Processing
Course Code: EC405
Contacts: 3:0:0
Contact Hours: 36
Credits: 3

On completion of the course students will be

CO1	Define discrete-time systems in the Frequency domain using DFT
CO2	Describe the process of finding system response using various method.
CO3	Discriminate the computation technique and speed of operation in FFT with respect to DFT.
CO4	Design digital filters for various applications.
CO5	Apply digital signal processing for the analysis of real-life signals.

CO-PO

COs\POs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	2	-	3	-	2	2	2	1	2
CO2	2	3	2	1	2	2	-	2	2	-	2	3
CO3	3	2	1	3	-	3	1	3	1	1	1	2
CO4	3	3	-	2	-	-	1	1	1	2	2	1
CO5	2	3	3	-	3	3	2	3	3	2	1	2

CO-PSO mapping

COs/POs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Gender, Culture and Development
Course Code: HSMC 402
Contacts: 2:0:0
Total Contact Hours: 24
Credit: 2

On completion of the course students will be

CO1	Provide an analysis of the location of women in the processes of economic development to understand what economic development is, the scales or levels at which it occurs, and the centrality of gender at every level.
CO2	Examine theoretical and conceptual frameworks for that analysis
CO3	Reflect upon linkages between the global economy and the gendered macro and microprocess of development and transitions from 'government' to 'governance.'
CO4	Explain the usefulness of a rights-based approach to gender justice.
CO5	Provide basis for research, practical action, and policy formulation and or evaluating for evaluating directions and strategies for social change from a gender perspective.

CO-PO Mapping:

COs \POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	2	1	-	-	-	2	3	3
CO2	3	2	-	1	3	2	-	1	2	-	3	3
CO3	3	2	2	-	2	3	1	-	2	1	3	3
CO4	3	1	-	2	-	-	-	2	-	3	3	3
CO5	3	2	-	1	-	1	2	-	2	-	3	3

CO-PSO mapping

COs/POs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-
CO5	-	-	-

Course Name: EM theory and Antenna Lab
Course Code: EC 491
Contact: 0:0:3
Credit: 1.5

CO1	To understand the theory of transmission lines in which EM wave propagate.
CO2	Define and identify different types of transmission line, its characteristics in various load conditions.
CO3	To realize the fundamentals of antenna theory.
CO4	Understand the different types of antennas and the radiation mechanism

CO-PO Mapping:

Cos/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	-	1	-	-	-	1	-	-	-	1
CO3	3	1	1	1	-	-	-	-	-	-	-	-
CO3	3	2	-	1	-	-	-	-	-	-	-	2
CO4	2	3	-	-	1	-	1	-	-	-	-	1

CO-PSO mapping

COs/POs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Analog Circuits Lab
Course Code: EC 492
Contact: 0:0:3
Credit: 1.5

Course Outcome
On completion of the course students will be

CO1	Students will be able to design transistor based single stage R-C coupled voltage amplifier, differential amplifier, and different classes of power amplifier circuit with given specification.
CO2	Students will be able to design transistor-based RC oscillator (Wien bridge and RC phase shift oscillator) circuit.
CO3	Students will be able to construct astable and mono-stable mode timer circuit using IC555.
CO4	Students will be able to design Integrator, differentiator, and low pass & high pass active filter circuit using Op-Amp (I.C-741)

CO-PO mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	1	1	2	3	-	-	3
CO2	3	3	2	2	2	-	2	-	3	-	2	3
CO3	3	2	2	1	2	2	1	2	3	1	-	2
CO4	3	3	3	3	2	-	2	-	3	-	1	3

CO-PSO mapping

COs/POs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Digital Electronics Lab
Course Code: EC 493
Contact: 0:0:3
Credit: 1.5

Course Outcome
On completion of the course students will be

CO1	Able to understand the fundamental concepts and techniques used in digital electronics
CO2	Able to understand and examine the structure of various number systems, De-Morgan's law, Boolean algebra and its application in digital design.
CO3	Able to understand, analyse the timing properties (input setup and hold times, minimum clock period, output propagation delays) and design various combinational and sequential circuits using various metrics: switching speed, throughput/latency, gate count and area, energy dissipation and power.
CO4	Able to understand different TTL logic.
CO5	Able to design digital circuits by their own

CO-PO mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	1	3	1	1	1	-	-	1	3
CO2	3	3	3	1	3	1	1	-	1	1	1	3
CO3	3	3	3	3	3	2	2	1	-	1	2	3
CO4	3	3	3	3	3	2	2	1	-	2	1	3
CO5	3	3	3	3	3	1	2	1	2	2	2	3

CO-PSO mapping

COs/POs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Analog & Digital Communication Systems Lab
Course Code: EC 494
Contact: 0:0:3
Credit: 1.5

Course outcome:

On completion of the course students will be

CO1	Analyse the concept of analog and digital communication techniques and their applications.
CO2	Demonstrate to the practical methods of the use of generating communication signals.
CO3	Evaluate practical methods of the use of demodulation of communication signals.
CO4	Distinguish the significance of signal constellation and pectral width.
CO5	Develop insight into the relations between the input and output signals in various stages of a transmitter and a receiver.

CO-PO mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	-	1	1	-	-	2	-	3	3
CO2	3	-	-	3	3	-	2	-	-	1	3	3
CO3	3	3	3	3	2	2	-	-	1	-	3	3
CO4	3	-	3	2	3	-	2	-	-	2	3	3
CO5	3	2	-	3	3	2	-	-	-	-	3	3

CO-PSO mapping

COs/POs	PSO1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Digital Signal Processing Lab
Course Code: EC495
Contacts: 0:0:3
Credits: 1.5

Course outcome:

On completion of the course students will be

CO1	Able to compute the system output using convolution method with MATLAB Software package
CO2	Able to verify the system characteristics
CO3	Able to Calculate DFT, FFT, IDFT using MATLAB
CO4	Able to analyse Magnitude and phase characteristics (Frequency response Characteristics of digital IIR Butterworth.
CO5	AbletoDevelopandImplementDSPalgorithmsinsoftwareusingacomputerlanguagesuchasCwith TMS320C6713 floating point Processor.

CO-PO Mapping:

COs\POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	3	2	1	1	1	-	1	-	1	-	-
CO2	2	2	3	1	1	-	-	1	-	-	-	-
CO3	2	1	2	2	3	1	1	-	-	1	2	2
CO4	3	1	3	2	2	1	2	2	3	1	-	2
CO5	3	1	3	3	2	1	2	2	3	1	-	2

CO-PSO mapping

COs/POs	**PSO1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Principle of Management
Course Code: HU 501
Contact: 2:0:0
Total contact-hour: 24
Credit:2

Course outcome:

On completion of the course students will be able to:

CO1	To recall and identify the relevance of management concepts.
CO2	To apply management techniques for meeting current and future management challenges faced by the organization
CO3	To compare the management theories and models critically to solve real life problems in an organization.
CO4	To apply management techniques for meeting current challenges.

CO/PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	-	3	-	3	-
CO2	-	-	-	-	-	2	-	3	3	-	3	3
CO3	-	-	-	-	-	-	-	-	2	-	3	3
CO4	-	-	-	-	-	2	-	-	3	-	3	-

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	-	-	2
CO2	-	-	2
CO3	-	-	2
CO4		-	2
CO5	-	-	2

Course Name: Microprocessor and Microcontroller
Course Code: EC 501
Contact: 3:0:0
Total contact-hour: 36
Credit:3

Course outcome:

On completion of the course students will be able to:

CO1	To explain the architecture instructions, timing diagrams, addressing modes, memory interfacing, interrupts,data communication of 8085,8086 microprocessors and 8051 microcontrollers.
CO2	Able to interpret the 8086 microprocessor-Architecture, Pin details, memory segmentation, addressing modes,basic instructions,interrupts.
CO3	Recognize 8051 micro controller hardware, input/output pins, ports, external memory, counters and timers,instruction set, addressing modes, serial data i/o, interrupts.
CO4	Apply instructions for assembly language programs of 8085, 8086 and 8051.
CO5	Design peripheral interfacing model using IC 8255, 8253, 8251 with IC 8085, 8086 and 8051.

CO-PO Mapping:

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	1	2	-	-	2	2	2	1	3
CO2	3	3	3	1	2	-	-	2	2	2	1	3
CO3	3	3	3	1	2	-	-	2	2	2	1	3
CO4	3	3	3	2	2	-	1	2	2	2	2	3
CO5	3	3	3	2	2	-	-	2	2	2	1	3

CO-PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	-	-	2
CO2	-	-	2
CO3	-	-	2
CO4		-	2
CO5	-	-	2

Course Name: RF & Microwave Engineering
Course Code: EC 502
Contact: 3:0:0
Total contact-hour: 36
Credit:3

Course outcome: On completion of the course students will be able to:

CO1	Understand the Microwave Frequency range and their application.
CO2	Develop fundamental understanding of the Two –port RF network and matching techniques.
CO3	Learn the Scattering matrix for microwave passive components
CO4	Understand the Microwave tubes and devices along with their fundamental principle of Operation.
CO5	Learn the microwave measurements techniques.

CO/PO Mapping

Cos\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	1	2	2	1	1	1	2	1	2
CO 2	3	3	3	2	2	2	2	1	1	1	2	1
CO 3	3	3	3	2	2	2	2	1	1	1	1	1
CO 4	3	3	3	2	2	2	2	1	1	1	2	1
CO 5	3	3	3	2	2	2	2	1	2	2	1	1

CO-PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	2	3
CO3	3	3	3
CO4	3	3	3
CO5	2	3	2

Course Name: Computer Network
Course Code: EC 503
Contact: 3:0:0
Total contact-hour: 36
Credit:3

Course outcome:
On completion of the course students will be able to:

CO1	Analyze various protocols in Data Communication
CO2	Analyze error control and flow control in Data Communication
CO3	Design Networking structure in Data communication
CO4	Analyze various encryption techniques, identify some of the factors driving the need for network Security

CO/PO Mapping

COs\ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	1	-	1	-	-	-	-	-
CO2	2	2	3	1	-	1	-	1	-	-	-	-
CO3	2	2	2	1	1	1	-	-	-	-	-	-
CO4	3	1	1	2	2	-	1	-	-	-	-	-

CO-PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	2	3
CO3	3	3	3
CO4	3	3	3

Course Name: Mobile Communication and Network
Course Code: PEC 501A
Contact: 3:0:0
Total contact-hour: 36
Credit:3

Course outcome: On completion of the course students will be able to:

CO1	Describe the evolution and History of Wireless Technology
CO2	Explain cellular concept for mobile communication.
CO3	Learnradiosignalpropagationissuesanddifferenttechnologicaladvancementofmobilecommunication, Wireless and Radio channels.
CO4	Compare3GCellulartelephonedatatransferrateswiththoseoverWirelessLANandcorenetworksassociated with 3G Cellular networks.
CO5	Describe mobile IP allocation and function of the station roaming. and describe the new key technologies related to 5G.

CO/PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	1	3	2	2	2	3	2	1
CO2	2	-	2	-	3	2	2	2	3	2	3	2
CO3	2	-	3	3	3	2	1	2	3	1	3	1
CO4	2	2	1	-	2	3	2	2	3	2	3	-
CO5	2	-	3	3	3	2	2	2	3	1	3	1

CO/PSO Mapping

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Fiber Optic Communication
Course Code: PEC 501B
Contact: 3:0:0
Total contact-hour: 36
Credit:3

Course outcome: On completion of the course students will be able to:

CO1	Recognize and classify the structures of Optical fiber and types.
CO2	Discuss the channel impairments like losses and dispersion.
CO3	Classify the Optical sources and detectors and to discuss their principle.
CO4	Familiar with Design considerations of fiber optic systems and to define the Wavelength Division Multiplexing. (WDM) principles and concepts and toper form characteristics of optical fiber, sources and detectors.
CO5	To analyze optical fiber measurement systems.

CO/PO Mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P0 12
CO1	3	3	2	2	2	1	-	-	-	-	-	-
CO2	3	2	3	1	2	-	-	-	-	-	-	1
CO3	3	3	2	1	1	-	-	1	-	1	-	-
CO4	3	3	2	1	2	1	1	-	1	-	1	-
CO5	3	2	3	1	2	1	-	1	-	1	2	1

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: ELECTRONICS MEASUREMENT & INSTRUMENTATION
Course Code: PEC 501C
Contact: 3:0:0
Total contact-hour: 36
Credit:3

Course outcome:
On completion of the course students will be able to:

CO1	Students able to explain the characteristics, construction and working principle analog instruments like PMMC, MI, Electrodynamometer type and Energy meter.
CO2	Students able to demonstrate the principle to measure resistance, capacitance, inductance with the help of Bridge balancing technique
CO3	Students able to describe the construction and working principle of electronic instrument like: DSO, DMM, spectrum analyzer, distortion meter
CO4	Student able to illustrate the functionality of sensor and transducer element
CO5	Student able to demonstrate the principle of working of Telemetry System Display device, Interface Standard, Data Acquisition system, Advanced Instruments Like OTDR, virtual instrument and PLC.

CO/PO Mapping

COs\POs	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	2	2	-	-	-	1	1	1	2
CO2	3	2	1	2	1	-	-	-	1	2	1	2
CO3	3	3	3	2	3	-	-	-	1	2	2	3
CO4	3	3	3	3	3	2	2	2	2	2	1	3
CO5	3	2	2	2	3	2	2	2	3	2	3	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Satellite Communication
Course Code: PEC 501D
Contact: 3:0:0
Total contact-hour: 36
Credit:3

Course outcome:
On completion of the course students will be able to:

CO1	Able to learn the orbital aspects of the satellite and the design of satellite links.
CO2	Able to understand the Satellite transponder and Earth Station Design
CO3	Able to understand Multiple Access Techniques used in satellite communication
CO4	AbletorealizethevariousPropagationimpairmentsonsatellitecommunication
CO5	Able to comprehend satellite Navigation and the GPS, GI Sand remote sensing

CO/PO Mapping

Cos\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	2	-	2	-	1	-	3
CO2	-	3	-	2	-	1	2	-	1	-	-	3
CO3	2	-	2	-	1	-	3	-	2	-	-	3
CO4	3	-	1	-	2	-	2	-	-	1	1	3
CO5	2	3	-	2	-	1	2	-	1	-	-	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Computer Architecture
Course Code: PEC 502A
Contact: 3:0:0
Total contact-hour:
36Credit:3

Course outcome:
On completion of the course students will be able to:

CO1	learn how computers work
CO2	know basic principles of computer's working
CO3	analyze the performance of computers
CO4	know how computers are designed and built
CO5	understand issues affecting modern processors (caches, pipelines etc.)

CO/PO Mapping

Cos\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	1	2	-	2	-	-	-	-	-	3
CO2	-	2	-	3	-	1	-	-	-	-	-	3
CO3	2	-	-	-	2	-	3	-	-	-	-	3
CO4	3	-	1	-	-	-	2	-	-	-	-	3
CO5	3	-	2	-	-	2	1	-	-	-	-	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-
CO5	-	-	-

Course Name: Digital Image & Video Processing
Course Code: PEC 502B
Contact: 3:0:0
Total contact-hour: 36
Credit:3

Course outcome:
On completion of the course students will be able to:

CO1	Have a clear idea on Digital Imaging fundamentals and Importance of Digital Image Transform
CO2	Understanding the importance of Digital Image enhancement in spatial and frequency domain and filtering techniques.
CO3	Explaining the requirements and types of Image Compression and its standards.
CO4	Demonstrate the basic concepts of Digital Image Segmentation and Edge detection of Digital Images.
CO5	Familiarize with Security in Digital Image Processing and Basic Steps of Video Processing and its 2 D modeling.

CO/PO Mapping

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COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	1	-	-	2	-	-	-	-	-	3
CO2	-	3	-	2	-	1	-	-	-	-	-	3
CO3	2	-	-	-	1	-	3	-	-	-	-	3
CO4	3	-	1	-	-	-	2	-	-	-	-	3
CO5	2	-	2	-	-	3	1	-	-	-	-	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Embedded System
Course Code: PEC 502C
Contact: 3:0:0
Total contact-hour: 36
Credit:3

Course outcome:
On completion of the course students will be able to:

CO1	Know the overview of embedded processors
CO2	Interface the memories with the embedded processors
CO3	Interface sensors and actuators with the processors
CO4	Establish parallel and serial communication with the process or through high speed wireless devices like Zigbee, Bluetooth, GSM modules etc.
CO5	Perform real time projects which may be beneficial to the society

CO/PO Mapping

COs\POs	PO1	PO2	PO3	PO4	PO5	PO 6	PO 7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	1	-	-	2	-	-	-	-	-	3
CO2	-	3	-	2	-	1	-	-	-	-	-	3
CO3	3	-	-	-	1	-	3	-	-	-	-	3
CO4	3	-	1	-	-	-	2	-	-	-	-	3
CO5	2	-	2	-	-	3	1	-	-	-	-	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Advanced Python Programming
Course Code: PEC 502D
Contact: 3:0:0
Total contact-hour: 36
Credit:3

Course outcome:
On completion of the course students will be able to:

CO1	Able to understand Basic data types and variables, Basic operators, control statement, string operations, idea of list, tuples & dictionary, functions in Python.
CO2	Able to understand class, objects, Inheritance and Polymorphism using Python.
CO3	Able to illustrate exceptions, threads in Python.
CO4	Able to describe GUI using Python.
CO5	Able to understand networking and database handling using Python.

CO/PO Mapping

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	1	-	-	2	-	-	-	-	-	3
CO2	-	3	-	2	-	1	-	-	-	-	-	3
CO3	3	-	-	-	1	-	3	-	-	-	-	3
CO4	3	-	1	-	-	-	2	-	-	-	-	3
CO5	2	-	2	-	-	3	1	-	-	-	-	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Microprocessor and Microcontroller Lab
Course Code: EC591
Contact: 0:0:3
Total contact-hour: 36
Credit:1.5

Course outcome:
On completion of the course students will be able to:

CO1	Able to solve small assignments using the 8085 basic instruction sets and memory mapping through trainer kit and simulator.
CO2	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.
CO3	Able to validate the interfacing technique using 8255 trainer kits through subroutine callsand IN/OUT instructions like glowing LEDs accordingly, stepper motor rotation etc.
CO4	Able to test fundamental of 8051 programs using the trainer kit.

CO/PO Mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	1	2	-	-	2	2	2	1	3
CO2	3	3	3	1	2	-	-	2	2	2	1	3
CO3	3	3	3	1	2	-	-	2	2	2	1	3
CO4	3	3	3	2	2	-	1	2	2	2	2	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: RF & Microwave Engineering Lab
Course Code: EC592
Contact: 0:0:3
Total contact-hour: 36
Credit:1.5

Course outcome:
On completion of the course students will be able to:

CO1	Able to define, identify and list out special type transmission line, its characteristics in microwave frequencies and concept of load.
CO2	Able to recognize, memorize, categorize, arrange and implement suitably the various microwave passive devices with the utilization of engineering mathematics.
CO3	Able to analyses and use the various sources of microwave energy and the characters of its operation.
CO4	Able to use, compute, solve, demonstrate and apply various hardware, software tools and measuring instruments in the field of Radio Frequencies, for the betterment of communication engineering, medical science and various domestic and commercial engineering.

CO/PO Mapping

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	-	2	-	3	-	-	3
CO2	3	3	3	3	2	-	2	-	3	-	-	3
CO3	3	3	3	3	2	-	2	-	3	-	-	3
CO4	3	3	3	3	2	-	2	-	3	-	-	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Mobile Communication and Network LabCourse Code: PEC591A
Contacts: 0:0:3
Credits: 1.5

Course outcome: On completion of the course students will be able to:
CO1: Understand the path Loss.
CO2: Analyze the Horizontal & vertical Beam Pattern of a Base station Antenna.
CO3: Understand the concept of co-channel interference and hence Signal to Interference andNoise Ratio.
CO4: Understand the impact of many different parameters influence the downlink C/I ratio like Cell radios, Tx power of B.S, Frequency reuse, Sectoring, Shadowing effect, B.S. height, Path loss exponent, Vertical beam tilt.
CO5: Study the effect of handover threshold and margin on SINR and call drop probability and handover probability.

CO-PO Mapping:

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	1	3	2	2	2	3	2	1
CO2	2	-	2	-	3	2	2	2	3	2	3	2
CO3	2	-	3	3	3	2	1	2	3	1	3	1
CO4	2	2	1	-	2	3	2	2	3	2	3	-
CO5	2	-	3	3	3	2	2	2	3	1	3	1

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Not matched.

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Fiber Optic Communication Laboratory
Course Code: PEC591B
Contact: 0:0:3
Total contact-hour: 36
Credit:1.5

Course outcome:
On completion of the course students will be able to:

CO1	Basic knowledge about the input output characteristics.
CO2	Able to define and analyze the attenuation constant, bending loss
CO3	Able to define, analyze and draw V-I characteristics of optical fiber.
CO4	Able to define, analyze and draw P-I characteristics of optical fiber.

CO/PO Mapping

COs \ POs	P O1	P O2	P O3	P O4	P O5	P O6	P O7	P O8	P O9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	-	-	-	-	-	-
CO2	3	2	3	1	2	-	-	-	-	-	-	1
CO3	3	3	2	1	1	-	-	1	-	1	-	-
CO4	3	3	2	1	2	1	1	-	1	-	1	-

CO/PSO Mapping

COs/PSOs	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Measurement and Instrumentation Laboratory
Course Code: PEC591C
Contact: 0:0:3
Total contact-hour: 36
Credit:1.5

Course outcome:
On completion of the course students will be able to:

CO1	Conduct experiment to measure of Resistance, Inductance, Capacitance, Power and Energy.
CO2	Students able to demonstrate the principle to measure resistance, capacitance, inductance with the help of Bridge balancing technique
CO3	Students able to describe the construction and working principle of electronic instrument like:DSO, DMM, spectrum analyzer, distortion meter
CO4	Student able to illustrate the functionality of sensor and transducer element
CO5	Student able to demonstrate the principle of working of Telemetry System Display device, Interface

CO/PO Mapping

COs\ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	2	2	-	-	-	1	1	1	2
CO2	3	2	1	2	1	-	-	-	1	2	1	2
CO3	3	3	3	2	3	-	-	-	1	2	2	3
CO4	3	3	3	3	3	2	2	2	2	2	1	3
CO5	3	2	2	2	3	2	2	2	3	2	3	3
CO6	3	2	2	2	2	2	2	2	2	2	2	2

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Satellite Communication Laboratory
Course Code: PEC591D
Contact: 0:0:3
Total contact-hour: 36
Credit:1.5

Course outcome:
On completion of the course students will be able to:

CO1	Able to learn the orbital aspects of the satellite and the design of satellite links.
CO2	Able to understand the Satellite transponder and Earth Station Design.
CO3	Able to understand Multiple Access Techniques used in satellite communication.
CO4	Able to realize the various Propagation impairments on satellite communication.
CO5	Able to comprehend satellite Navigation and the GPS, GIS and remote sensing.

CO/PO Mapping

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	2	-	1	-	2	-	3
CO2	-	3	-	2	-	1	2	-	2	-	-	3
CO3	2	-	-	-	1	-	3	-	1	-	-	3
CO4	3	-	1	-	2	-	2	-	-	-	2	2
CO5	2	1	-	-	1	-	3	-	1	-	-	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Computer Architecture Lab
Course Code: PEC592A
Contact: 0:0:3
Total contact-hour: 36
Credit:1.5

Course outcome:
On completion of the course students will be able to:

CO1	learn VHDL programming
CO2	implement arithmetic circuits using VHDL programming
CO3	implement RAM and ROM architectures
CO4	design register, counter and control unit
CO5	implement complex projects related to computer architecture

CO/PO Mapping

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	1	-	-	3	-	2	-	1	-	3
CO2	-	3	-	2	-	1	-	-	2	-	2	3
CO3	3	-	-	-	1	-	3	1	-	1	-	3
CO4	2	-	1	-	3	-	2	-	2	-	2	3
CO5	3	-	1	-	-	3	2	-	-	-	-	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: : Digital Image & Video Processing Lab
Course Code: PEC592B
Contact: 0:0:3
Total contact-hour: 36
Credit:1.5

Course outcome:
On completion of the course students will be able to:

CO1	Build knowledge on Digital Imaging fundamentals and Digital Image Transform.
CO2	Understanding Digital Image enhancement techniques in spatial and frequency domain
CO3	Explaining the requirements and types of Image Compression and its standards.
CO4	Demonstrate the Segmentation and Edge detection techniques of Digital Images
CO5	Build ideas on Digital Image security and Basic Steps of Video Processing

CO/PO Mapping

COs\ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	1	-	-	2	-	2	-	-	-	3
CO2	-	3	-	2	-	1	-	-	2	-	-	3
CO3	2	-	1	-	1	-	3	-	-	2	-	3
CO4	3	-	1	-	-	-	2	1	-	-	-	3
CO5	2	-	2	-	-	3	1	-	-	2	-	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: : Embedded System Lab
Course Code: PEC592C
Contact: 0:0:3
Total contact-hour: 36
Credit:1.5

Course outcome:
On completion of the course students will be able to:

CO1	To program embedded processors
CO2	Interface the memories with the embedded processors
CO3	Interface sensors and actuators with the processors
CO4	Establish parallel and serial communication with the process or sthrough high speed wireless devices like Zigbee, Bluetooth, GSM modules etc.
CO5	Perform real time projects which may be beneficial to the society

CO/PO Mapping

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	1	-	-	3	-	-	-	-	-2	3
CO2	-	3	-	3	-	1	-	-	-1	2	-	3
CO3	3	-	-	-	1	-	3	2	-	-	-	3
CO4	2	-	1	-	3	-	2	-	-	1	-2	3
CO5	3	-	2	-	-	3	1	-	2	-	-	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: : Advanced Python Programming Lab
Course Code: PEC592D
Contact: 0:0:3
Total contact-hour: 36
Credit:1.5

Course outcome:
On completion of the course students will be able to:

CO1	Able to apply class and objects
CO2	Able to analyze exceptions and threads
CO3	Able to evaluate polymorphism
CO4	Able to apply GUI using Python
CO5	Able to apply networking and database using Python

CO/PO Mapping

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	1	-	-	3	-	-	-	-	-2	3
CO2	-	3	-	3	-	1	-	-	-1	2	-	3
CO3	3	-	-	-	1	-	3	2	-	-	-	3
CO4	2	-	1	-	3	-	2	-	-	1	-2	3
CO5	3	-	2	-	-	3	1	-	2	-	-	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Constitution of India
Course Code: MC501
Contact: 2:0:0
Total contact-hour: 24
Credit: 0

Course outcome:
On completion of the course students will be able to:

CO1	Identify and explore the basic features and modalities of Indian constitution.
CO2	Differentiate and relate the functioning of Indian parliamentary system at the center and state level.
CO3	Differentiate the various aspects of Indian Legal System and its related bodies.
CO4	Understand the structure and composition of Indian constitution.

CO/PO Mapping

COs\POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2	2	-	2	-	3	-	1	3	3
CO2	3	2	-	1	-	1	-	2	2	3	3	3
CO3	3	-	1	-	-	3	-	2	-	1	3	3
CO4	2	2	-	1	-	1	-	2	2	3	3	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-
CO5	-	-	-

Third Year 2nd Semester(6th Semester)

Course Name: Economics for Engineers
Course Code:HSMC604
Contact: 2:0:0
Total contact-hour: 24
Credit: 2

Course outcome:
On completion of the course students will be able to:

CO1	To Identify various uses for scares resources
CO2	To understand key economic concepts and implement in real world problems
CO3	Differentiate the various aspects of Indian Legal System and its related bodies.
CO4	To evaluate business performance through cost accounting principles

CO/PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO8	PO9	PO10	PO11	PO12
CO1	-	3	-	1	-	-	-	2	-	1	-	2	-
CO2		-		-	-	-	3	-	-	-	-	2	-
CO3	-	1	-	2	2	3	-	-	1	-	1	2	2
CO4	1	-	-	3		-	-	2	-	-	-	3	2

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-
CO5	-	-	-

Course Name: VLSI & Microelectronics
Course Code:EC601
Contact: 3:0:0
Total contact-hour: 36
Credit: 3

Course outcome:
On completion of the course students will be able to:

CO1	Able to illustrate scale of integration – SSI, MSI, LSI, VLSI, Moor's Law, scaling, short channel effect, VLSI design flow, FPGA architecture, classify Standard IC & ASIC, and construct gate level circuit with the help of PAL & PL Aarchitecture.
CO2	Able to analyze CMOS inverter voltage transfer characteristics with the parameters – VIL , VIH , VOL ,VOH , Vth and based on the knowledge of digital circuit design methodology like – CMOS , Pass transistor ,TG , DCVSL , dynamic logic , NORA , able to construct schematic of simple and complex combinational circuit, sequential circuit(SR flip-flop , JK flip-flop , D flip flop) , 6 T - SRAM Cell , 3T- DRAM cell using MOSFET.
CO3	Able to estimate the value of resistance of current source/sink, MOS diode , current of current mirrorcircuit , voltage of reference circuits (voltage divider , threshold voltage references and band gap reference),value of parameters to design CMOS differential amplifier , resistance of switch capacitor circuit , gain of switch capacitor integrator and 1st order switch capacitor filter based on the concept of small signal model & switching characteristics of MOSFET.
CO4	Able to describe thefabrication steps of ICsandconstruct the stick diagram & layout of CMOS inverter& basic gates based on lambda and micron design rules.
CO5	Able to estimate the gate delay, dynamic power, short circuit power and leakage power and total power consumption across CMOS inverter circuit with the help of switching activity, saturation & linear region current equations of MOSFETs and principle of charging & discharging of capacitor.

CO/PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	1	2	-	-	2	2	3	2	3
CO2	3	3	3	3	2	-	-	1	2	2	3	3
CO3	3	3	3	2	2	-	-	2	2	2	3	3
CO4	3	3	3	1	2	-	-	1	2	2	3	3
CO5	3	3	3	2	2	-	-	2	3	2	3	2

CO/PSO Mapping

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Control Systems
Course Code:EC602

Contact: 3:0:0
Total contact-hour: 36
Credit: 3

Course outcome:
On completion of the course students will be able to:

CO1	Apply modelling techniques to represent physical systems and distinguish between open loop and closed loop control systems.
CO2	Determine the time responses of different type of systems and compute time domain specifications.
CO3	Analyze the stability of control systems using root-locus.
CO4	Examine the relative stability of control systems using frequency domain analysis
CO5	Design controllers according to desired performance specifications.

CO/PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	3	2	-	-	-	-	-	1	1	-	1
CO2	3	2	2	-	-	-	-	-	2	1	-	1
CO3	3	2	1	2	1	1	-	-	2	1	-	-
CO4	3	1	-	-	1	1	-	-	2	1	-	1

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Information Theory & Coding
Course Code:PEC602A
Contact: 3:0:0
Total contact-hour: 36
Credit: 3

Course outcome:
On completion of the course students will be able to:

CO1	Understand the concepts of information, mutual information and entropy and various source coding techniques
CO2	Analyse the need for error control techniques in a digital communication system channel model, channel capacityand channel coding techniques.
CO3	Apply linear algebra, concept of Galois field, conjugate roots, minimal polynomial in channel coding techniques for error control.
CO4	Generate different error control codes like linear block codes, cyclic codes, BCH codes, and perform error detection and correction.
CO5	Design the circuit for different error control coding techniques.

CO/PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	1	-	1	-	-	-	-	-
CO2	3	2	3	2	-	1	-	1	-	-	-	1
CO3	2	2	2	1	2	1	-	-	-	-	-	-
CO4	3	3	1	2	2	-	2	1	-	-	-	1
CO5	3	2	1	-	1	-	1	-	-	-	-	-

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Renewable Energy Sources & Applications
Course Code:PEC602B
Contact: 3:0:0
Total contact-hour: 36
Credit: 3

Course outcome:
On completion of the course students will be able to:

CO1	Explain the importance of Renewable energy over conventional process
CO2	Describe different methods of Power generation from the Non- conventional sources like Solar, Wind Energy, Biomass, Geothermal energy, OTEC, Tidal energy, MHD Power generation schemes.
CO3	Analyze the different techniques of grid integration of the power generated from renewable energy sources with the initiation of power electronic converters and drives.
CO4	Design different hybrid energy systems and energy storage systems.

CO/PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	1	-	2	-	2	2	2	2	3
CO2	3	2	2	1	2	3	-	2	2	1	2	3
CO3	3	2	1	3	-	3	1	3	1	1	1	3
CO4	3	2	2	1	2	3	-	2	2	1	2	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Nano Electronics
Course Code:PEC602C
Contact: 3:0:0
Total contact-hour: 36
Credit: 3

Course outcome:
On completion of the course students will be able to:

CO1	Explain the fundamental science and quantum mechanics.
CO2	comprehendthebasicsofnano-electronicsandthephenomenainvolvedintheoperationof nano-devices.
CO3	explain the fabrication details and analytical techniques of nanomaterials.
CO4	realize the advantages of the nano-materials and its appropriate use in solving practical problems.

CO/PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	1	-	2	-	2	2	2	2	3
CO2	3	2	2	1	2	3	-	2	2	1	2	3
CO3	3	2	1	3	-	3	1	3	1	1	1	3
CO4	3	2	2	1	2	3	-	2	2	1	2	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Remote Sensing & GIS
Course Code:PEC602D
Contact: 3:0:0
Total contact-hour: 36
Credit: 3

Course outcome:
On completion of the course students will be able to:

CO1	Interpret the basic concept of remote sensing and GIS.
CO2	Recognize the principles of aerial and satellite remote sensing.
CO3	Describe different types of sensors in remote sensing and data representation in GIS.
CO4	Explain the about the different kinds of radar for atmospheric remote sensing.
CO5	Apply knowledge of GIS software and able to work with GIS software in various application fields.

CO/PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3		3	-	-	-	-	-	3	-	3	-
CO2	-	-	-	-	-	2		3	3	-	3	3
CO3	3	-	-	-	-	-	-	-	2	-	3	3
CO4	-	-	-	-	-	2	-	-	3	-	3	-
CO5	-	2	-	2	-	-	-	2	3	-	3	-

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: OBJECT ORIENTED PROGRAMMING USING JAVA
Course Code:OEC601A
Contact: 3:0:0
Total contact-hour: 36
Credit: 3

Course outcome:
On completion of the course students will be able to:

CO1	Understand the key concepts of object-oriented programming and have an ability to design Object Oriented programs and appreciate the techniques of good design.
CO2	Understand advanced features of Java.
CO3	Analyze complex programming problems and optimize the solutions.
CO4	Apply an understanding of ethical principles to problems which commonly arise in the Information Technology Industry.

CO/PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	2	-	-	-	-	-	2
CO2	3	2	2	2	3	2	-	-	-	-	-	2
CO3	3	3	3	3	2	2	-	-	-	-	-	2
CO4	3	3	3	2	3	2	-	-	3	-	3	2

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Fundamentals of Sensor and Transducers
Course Code:OEC601B
Contact: 3:0:0
Total contact-hour: 36
Credit: 3

Course outcome:
On completion of the course students will be able to:

CO1	Familiar with the basics of measurement system and its input, output configuration of measurement system
CO2	Familiar with both static and dynamic characteristics of measurement system
CO3	Familiar with the principle and working of various sensors and transducers
CO4	Able to design signal conditioning circuit for various transducers
CO5	Able to identify or choose a transducer for a specific measurement application Course contents

CO/PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	1	-	1	2	2	1	1	2
CO2	3	1	2	-	2	-	-	-	1	-	1	-
CO3	3	2	3	1	2	2	1	-	-	-	-	-
CO4	3	1	3	2	2	1	-	-	-	-	-	-
CO5	3	2	3	2	3	2	-	-	-	-	-	-

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Introduction to Quantum Computing
Course Code:OEC601C
Contact: 3:0:0
Total contact-hour: 36
Credit: 3

Course outcome:
On completion of the course students will be able to:

CO1	Develop quantum logic gate and circuits
CO2	Explain the working of a Quantum Computing program, its architecture and program model
CO3	Develop quantum algorithm program on major toolkits
CO4	Design error correction circuits using quantum gates
CO5	Conceptualize the basic models of quantum cellular automata and partitioned quantum cellular automata.

CO/PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2	-	-	-	-	-	-	-	-	-
CO2	-	-	3	2	-	-	-	-	-	-	-	-
CO3	-	2	-	3	1	-	-	-	-	-	-	-
CO4	2	1	3	-	2	1	-	-	-	-	-	-
CO5	3	-	2	3	-	2	3	-	2	3	-	1

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-

Course Name: Fundamentals of Operating System
Course Code:OEC601D
Contact: 3:0:0
Total contact-hour: 36
Credit: 3

Course outcome:
On completion of the course students will be able to:

CO1	Describe how computing resources (such as CPU,memory and I/O) are managed bythe operating system.
CO2	Analyze kernel and user mode in an operating system.
CO3	Solve different CPU scheduling problem to achieve specific scheduling criteria.
CO4	Apply the knowledge of process management, synchronization, deadlock to solve basic problems.
CO5	Evaluate and report appropriate design choices when solving real-world problems

CO/PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	3	-	-	-	-	-	-	3
CO2	3	3	-	-	-	-	-	-	-	-	-	2
CO3	2	2	-	-	-	-	2	-	-	-	-	3
CO4	3	2	-	-	-	-	3	-	-	-	-	2
CO5	3	2	-	-	-	-	-	-	-	-	-	2

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: DATABASE MANAGEMENT SYSTEM
Course Code:OEC602A
Contact: 3:0:0
Total contact-hour: 36
Credit: 3

Course outcome:
On completion of the course students will be able to:

CO1	To learn the data models, conceptualize and depict a database system
CO2	To design system using E-R diagram.
CO3	To learnSQL& relational database design
CO4	To understand the internal storage structures using different file and indexing techniques.

CO/PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	-	3	-	-	-	-	-	1	1
CO2	2	2	3	-	3	-	-	-	-	-	1	1
CO3	2	2	3	-	3	2	2	-	-	-	1	1
CO4	3	2	3	2	3	-	2	-	-	-	2	1

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: 3D Printing & DesignCourse Code: OEC602B

Contact: 3:0:0

Contact Hours: 36

Credits: 3

Prerequisite: Computer Aided Design & Drafting, Engineering Materials

Course Outcomes:

CO1: Develop CAD models for 3D printing.

CO2:ImportandExportCADdataandselectaspecificmaterialforthegivenapplication.CO3:Selecta3Dprinting process for anapplication.

CO4: Produce a product using 3D Printing or Additive Manufacturing (AM).

CO – PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	-	3	-	-	-	-	-	1	1
CO2	2	2	3	-	3	-	-	-	-	-	1	1
CO3	2	2	3	-	3	2	2	-	-	-	1	1
CO4	3	2	3	2	3	-	2	-	-	-	2	1

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: WEB INTELLIGENCE & BIG DATA

Course Code:OEC602C

Contact: 3:0:0

Total contact-hour: 36

Credit: 3

Course outcome:

On completion of the course students will be able to:

CO1	understand Web Intelligence and Bigdata fundamentals.
CO2	Investigate various Data Analysis Techniques.
CO3	Analyze Machine Learning Algorithms using R
CO4	Implement Hadoop, Map Reduce and NO SQL in big data analytics.
CO5	Apply Hadoop ecosystem components for business and scientific computing.

CO/PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	3	3	2	2	2	2	-	-	-	-	2	2
CO2	3	2	2	2	3	2	-	-	-	-	2	2
CO3	3	3	3	3	2	2	-	-	-	-	2	2
CO4	3	3	3	2	3	2	-	-	-	-	2	2
CO5	3	3	3	2	3	2	-	-	-	-	2	2

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: SCIENTIFIC COMPUTING
Course Code:OEC602D
Contact: 3:0:0
Total contact-hour: 36
Credit: 3

Course outcome:
On completion of the course students will be able to:

CO1	Understand the different algorithms and their solutions in mathematics.
CO2	Investigate various cryptography Techniques.
CO3	Analyze various sorting algorithms.
CO4	Implement mathematics for finding computions.

CO/PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	2	-	-	-	-	2	2
CO2	3	2	2	2	3	2	-	-	-	-	2	2
CO3	3	3	3	3	2	2	-	-	-	-	2	2
CO4	3	3	3	2	3	2	-	-	-	-	2	2

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: VLSI & Microelectronics Lab
Course Code: EC 691
Contact: 3:0:0
Credit: 1

Course outcome:
On completion of the course students will be able to:

CO1	Able to measure & analyse VIL, VIH, VOL, VOH, noise margin, gate delay and average power consumption of CMOS inverter for VDD in between 0.5V - 1.2 V using nano dimensional channel length of MOS transistor following DC & transient analysis with the help of SPICE tools.
CO2	Abletodesign&explaintheworkingofbasicgates-AND/NAND,OR/NOR,XOR/XNORgate; full adder circuit; sequential circuit -SR latch, clocked SR latch & D flip-flop using CMOS design methodat schematic level for the VDD range 0.5Vto 1.2Vat nano dimensional channel length with the help of SPICE tools.
CO3	Able to construct the layout & examine the functionality of CMOS inverter, CMOS NAND, CMOS NOR gate using SPICE layout design tools based on design rules for VDD 0.5 Vto 1.2 V.
CO4	Able to design combinational circuits – logic gates, half adder, full adder, 4:1 MUX using 2:1 MUX ; sequential circuits-S-R flip-flop, 8-bit synchronous counter, 8-bit bi-directional register with help of behavioral , dataflow , structural & mixed modeling style through VHDL code and able to demonstrate system design using FPGA at prototype level .
CO5	Able to design CMOS differential amplifier with active load and biased with current mirror using nano dimensional channel length of MOS transistors with the help of SPICE tools at schematic level.

CO/PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	-	-	1	3	3	3	3
CO2	3	2	3	3	3	-	-	1	3	3	3	3
CO3	3	3	3	3	3	-	-	1	3	3	3	3
CO4	3	2	3	3	3	-	-	1	3	3	3	3
CO5	3	3	3	3	3	-	-	1	3	3	3	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: CONTROL SYSTEM LAB
Course Code:EC692
Contact: 0:0:3
Credit: 1.5

Course outcome:
On completion of the course students will be able to:

CO1	Analyze different types of electrical, mechanical and electromechanical systems.
CO2	Determine transient and steady state behaviour of different types of systems using standard test signals.
CO3	Determine the importance of gain, location of poles and zeros to design a system.
CO4	Check the stability of the system using the concept of different stability criterion.
CO5	Design the systems according to the desired specifications or requirements using different types of controller and compensator.

CO/PO MAPPING

CO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	3	2	-	-	-	-	-	1	1	-	1
CO2	3	2	2	-	-	-	-	-	2	1	-	1
CO3	3	2	1	2	1	1	-	-	2	1	-	-
CO4	3	1	-	-	1	1	-	-	2	1	-	1
CO5	1	1	3	2	1	1	-	-	2	1	-	1

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Object Oriented Programming Lab
Course Code: OEC 691A
Contact: 0:0:3
Credit: 1.5

Course outcome:
On completion of the course students will be able to:

CO1	Create the procedure of communication between Objects, classes & methods
CO2	Understand the elementary facts of Object Orientation with various characteristics as well as several aspects of Java.
CO3	Analyze distinct features of different string handling functions with various I/O operations.
CO4	Discuss simple Code Reusability notion w.r.t. Inheritance, Package and Interface.
CO5	Apply Exception handling, Multithreading and Applet (Web program in java) programming concept in Java.

CO/PO MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	-	-	-	1	-	-	1
CO2	3	2	2	-	1	-	-	-	1	-	-	2
CO3	2	3	2	3	-	-	-	-	2	-	-	-
CO4	1	-	-	-	-	-	-	-	1	2	-	2
CO5	2	1	1	-	1	-	-	-	2	-	-	2

CO/PSO Mapping

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Fundamentals of Sensors and Transducers Lab
Course Code: OEC 691B
Contact: 0:0:3
Credit: 1.5

Course outcome:
On completion of the course students will be able to:

CO1	Illustrate the working of transducers and various transducers used for the measurement of various physical variables.
CO2	Analyze the characteristics of the transducers..
CO3	Design sensor based on the real time application.
CO4	Estimate the design specifications of different transducers.

CO/PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	1	-	-	-	2	-	1	1
CO2	1	2	-	3	-	1	-	1	-	2	-	1
CO3	1	2	1	-	2	-	1	-	3	-	-	2
CO4	1	2	-	1	-	1	-	-	-	3	-	1

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Introduction to Quantum Computing Lab
Course Code: OEC 691C
Contact: 0:0:3
Credit: 1.5

Course outcome:
On completion of the course students will be able to:

CO1	Identify quantum gates and circuits
CO2	Explain the working of a Quantum Computing program, its architecture and program model
CO3	Develop quantum algorithm program on major tool kits
CO4	Handle complex projects on quantum circuits

CO/PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO 6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	2	-	-	1	-	-	-1
CO2	-	-	3	2	-	-	-	1	-	1	-	-
CO3	2	2	-	3	-	1		-	-	-	1	-
CO4	-	-	-	-	2	-	1	-	-	-1		-
CO5	3	-	2	-	1	-	-	-	1	-	1	-

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Operating Systems Lab
Course Code: OEC 691D
Contact: 0:0:3
Credit: 1.5

Course outcome:
On completion of the course students will be able to:

CO1	To Analyze different aspects of Linux.
CO2	To Create or design different scripts using shell programming.
CO3	To implement process, thread, semaphore concept of operating system.
CO4	Create shared memory with the implementation of reading from, write into shared memory.

CO/PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	1	1	-	2	-	-	-	3
CO2	-	3	3	3	-	-	-	-	1	-	1	3
CO3	2	-	-	2	-	1	-	1	-	1	-	-
CO4	-	3	3	-	-	-	3	-	2	-	-	1

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: DATABASE MANAGEMENT SYSTEM LAB
Course Code: OEC 692A
Contact: 0:0:3
Credit: 1.5

Course outcome:
On completion of the course students will be able to:

CO1	Understand the basic concepts regarding data base, know about query proces singandtechniquesinvolvedin query optimization and understand the concepts of database transaction and related database facilities including concurrency control, backup, and recovery.
CO2	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.
CO3	Differentiate between DBMS and advanced DBMS and use of advanced database concepts and become proficient in creating database queries.
CO4	Analyze database system concepts and apply normalization to the database.
CO5	Apply and create different transaction processing and concurrency control applications.

CO/PO MAPPING

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	2	2	2	2	3	2	1	1	2	2	3	3
CO2	2	3	3	3	3	1	-	1	2	2	2	3
CO3	3	3	2	-	3	2	2	2	3	3	3	1
CO4	3	2	2	2	2	1	1	1	1	1	-	3
CO5	3	3	3	3	3	2	2	2	3	3	3	3

CO/PSO Mapping

COs/PSOs	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: 3D Printing & Design Lab
Course Code: OEC 692B
Contact: 0:0:3
Credit: 1.5

Course outcome:
On completion of the course students will be able to:

CO1	Analyze CAD tools for different design.
CO2	Apply 2D model using
CO3	Apply 3D model using CAD tools.
CO4	Conceptualize andv isualize their designs

CO/PO MAPPING

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	2	2	2	2	3	2	1	1	2	2	3	3
CO 2	2	3	3	3	3	1	1	1	2	2	3	3
CO 3	3	3	2	3	3	2	2	2	3	3	3	3
CO4	3	2	2	3	3	2	2	2	2	3	-	2

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: WEB INTELLIGENCE & BIG DATA LABORATORY
Course Code: OEC 692C
Contact: 0:0:3
Credit: 1.5

Course outcome:
On completion of the course students will be able to:

CO1	Able to configure and run Hadoop and HDFS
CO2	Able to apply Map Reduce in practical problems
CO3	Implement Hadoop, Map Reduce and NO SQL in big data analytics.
CO4	Apply Hadoop ecosystem components for business and scientific computing.

CO/PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	2	-	-	-	-	2	2
CO2	3	2	2	2	3	2	-	1	-	1	2	2
CO3	3	3	3	3	2	2	1	-	1	-	2	2
CO4	3	3	3	2	3	2	-	-	-	-	2	2

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: SCIENTIFIC COMPUTING LAB
Course Code: OEC 692D
Contact: 0:0:3
Credit: 1.5

Course outcome:
On completion of the course students will be able to:

CO1	Analyze the various computing tools
CO2	Apply the computation techniques for complex mathematical problem solving.
CO3	Create the solution for a given problem using the techniques of scientific computing
CO4	Apply the various scientific computing tools for problem solving.

CO/PO MAPPING

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CO	PO1	PO2	PO3	PO 4	PO5	PO 6	PO7	PO8	PO 9	PO10	PO11	PO12
CO1	3	3	2	2	2	2	1	-	1	-	2	2
CO2	3	2	2	2	3	2	-	1	-	-	2	2
CO3	3	3	3	3	2	2	1	-	1	-	2	2
CO4	3	3	3	2	3	2	-	1	-	1	2	2

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Intellectual Property Right
Course Code: MC601
Contact: 0:0:3
Credit: 1.5

Course outcome:
On completion of the course students will be able to:

CO1	Explain fundamental aspects of Intellectual property Rights to students
CO2	Apply knowledge on patents, patent regime in India and abroad and registration aspects
CO3	Disseminate knowledge on copyrights and its related rights and registration aspects
CO4	Disseminate knowledge on trademarks and registration aspects
CO5	Understand knowledge on Design, Geographical Indication (GI), Plant Variety and Layout Design Protection and their registration aspects

CO/PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	1	2	3	-	-	2	-	2	3	3
CO2	3	1	-	1	-	-	1		1	-	3	2
CO3	3		1	2	3	-		2		2	2	3
CO4	3	1	-	1	-	-	1	-	1		3	3
CO5	3	-	2	-	2	3	-	-	-	2	3	2
CO6	3	2		1	-	-	-	2	2	-	2	3

CO/PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Internet of ThingsCourse Code:

PEC701A Contact: 3:0:0

Total Contact Hours: 36Credits: 3

Prerequisite: Sensors, Actuators, Microcontroller, Computer Networks

Course Objectives: The purpose of this course is to gather knowledge about Iot, its architecture different software and hardware components of IoT.Finallystudents will apply such knowledge to design some hands-on models showcasing different IoT applications.

Course Outcomes:

Graduates of the ECE program will be able to

CO1	understand Internet of Things and its hardware and software components
CO2	interface I/O devices, sensors & communication modules
CO3	remotely monitor data and control devices
CO4	develop real life IoT based projects

CO-PO Mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	-	-	-	-	2	-	-	3
CO2	3	3	2	3	-	-	-	-	-	-	-	2
CO3	3	3	3	2	-	-	-	-	2	-	-	3
CO4	3	2	2	3	-	-	-	-	2	-	-	2

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3

Course Name: Artificial IntelligenceCourse

Code: PEC701B

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course outcomes:

After completion of this course students will be able to

CO1	Understand the concept of AI .
CO2	Illustrate searching algorithms.
CO3	Analyze the representation of knowledge.
CO4	Demonstrate the learning methods.

CO-PO Mapping

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	-	-	-	-	2	-	-	3
CO2	3	3	2	3	-	-	-	-	-	-	-	3
CO3	3	3	3	2	-	-	-	-	2	-	-	3
CO4	3	2	2	3	-	-	-	-	2	-	-	3

CO-PSO Mapping

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	2	3
CO3	3	3	3
CO4	3	3	3
CO5	2	3	2

Course Name: Digital Control System

Course Code: PEC701C

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course outcome:

After completion of this course students will be

CO 1	Obtain an overview on Digital Control System and Modelling of System insampled domain.
CO 2	Design of any system in digital domain and analysis its stability..
CO 3	Obtain concept of Advanced Digital Control System Design and application of itsin industry.
CO 4	Obtain the concept of Digital Stability of the system

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	-	-	-	-		3	-	2	1
CO2	-	-	-	-	2	2	1	3	2	-	3	2
CO3	2	2	2	-	2	3	-	2	3	-	2	3
CO4	3	-	3	-	1	3	2	3	2	-	2	3

CO-PSO Mapping

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	2	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Cloud Computing

Course Code: PEC701D

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome: Graduates of the ECE program will be able to

CO 1	Articulate the business model concepts, architecture and infrastructure of cloud computing,including cloud service models and deployment models.
CO 2	Apply and design suitable Virtualization concept, Cloud Resource Management, anddesign scheduling algorithms.
CO 3	Explore some important cloud computing driven commercial systems such as GoogleApps, Microsoft Azure and Amazon Web Services and other businesses cloud applications.
CO 4	Analyze the core issues of cloud computing such as security, privacy, interoperability, and itsimpact on cloud application.

CO- PO Mapping:

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

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Notmatched.

CO-PSO mapping

COs/POs	PSO1	PSO2	PSO3
CO1	-	3	3
CO2	-	3	3
CO3	-	3	3
CO4	-	3	3
CO5	-	3	3

Course Name: Biomedical Electronics and Imaging

Course Code: PEC702A

Contact: 3:0:0

Total Contact Hours: 36Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO 1	Explain Bioelectric signals, human physiological system, and different types of transducers
CO 2	Understand different types of medical measurement system.
CO 3	Able to understand deferent types of biomedical signal acquisition electrodes and different types of signal amplification techniques and able to design the amplifiers.
CO 4	Able to examine the data handling, filtering techniques of bio-medical signals and able to analysis of time and frequency domain.
CO 5	Able to understand medical imaging techniques and implement different algorithms to feature extract the signals.

CO- PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	2	3	2	-	2	1	1	1	1	1	1	2
CO2	3	2	2	-	-	-	-	-	2	2	-	1
CO3	3	2	1	2	1	1	2	-	2	1	2	-
CO4	3	1	-	-	1	2	-	2	1	2	-	1
CO5	1	1	3	2	1	1	-	-	2	1	-	2

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Notmatched.

CO-PSO mapping

COs/POs	PSO1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Introductionto EDA Tools

Course Code: PEC702B

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO 1	Able to originate optimize model of IC with help of high level and logic level synthesis in digitaldomain
CO 2	Able to build and analyse VLSI Circuits in physical design phase with the help of partitioning ,flooring , placement and routing
CO 3	Able to elaborate and estimate the delay of a IC in design phase with the help of logical effort ,electrical effort , Elmore delay model , Directed Acyclic Graph (DAG).
CO 4	Able to predict fault in digital IC with the help of different fault model and D-algorithm and develop test pattern with the help of ATPG algorithm for BIST
CO 5	Able to design system with the help of Verilog HDL for the application in combinationalandsequential domain

CO-PO Mapping

COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO12
CO1	2	2	3	1	2	1	-	1	2	2	2	3
CO2	3	3	3	3	2	1	-	1	2	2	3	3
CO3	3	3	3	2	2	-	1	1	2	2	3	3
CO4	3	3	3	1	2	1	1	1	2	2	3	3
CO5	3	3	3	2	3	1	1	1	2	2	3	2

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Notmatched

CO-PSO Mapping:

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3
CO5	3	3	2

Course Name: Radar & Missile Communication

Course Code: PEC702C

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Understand the Fundamentals of Radar and Different types of Radar and their working
CO2	nalyze the Radar signal measurement and detection of target in clutter
CO3	Understand basics of missile design and the engineering aspects of missile integration.
CO4	Demonstrate the concept of guided missiles and aero dynamics of missiles.
CO5	Illustrate the various sub-systems used in missiles

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO1 0	PO1 1	PO12
CO1	3	3	3	-	1	1	-	-	2	-	-	3
CO2	2	3	-	3	2	-	2	-	-	1	3	3
CO3	3	2	3	3	2	2	-	-	2	-	-	2
CO4	3	3	3	2	2	-	2	-	-	3	2	3
CO5	3	3	-	3	3	2	-	-	-	-	-	3

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3
CO5	3	3	2

Course Name: Introduction to MEMS

Course Code: PEC702D

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Demonstrate the clean room concept
CO2	Implement the Substrate for MEMS
CO3	Conceptualize the deposition and photolithography process thoroughly.
CO4	Fabricate the MEMS devices through bulk micromachining techniques.
CO5	Explain the design, analysis and testing of MEMS.

CO- PO Mapping:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO1 0	PO1 1	PO1 2
CO1	2	3	3	2	2	-	2	-	3	1	1	3
CO2	3	3	2	3	2	-	2	-	3	-	-	2
CO3	2	3	3	3	2	-	2	-	3	1	2	3
CO4	3	3	2	2	2	-	2	-	3	-	-	3
CO5	3	3	3	3	2	-	2	-	3	2	2	2

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Notmatched

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3
CO5	3	3	2

Course Name: Data ScienceCourse

Code: OEC702A Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Describe the basic and intermediate concepts of probability, statistics, and distributions.
CO2	Able to Apply regression, ANOVA, and goodness of fit test to construct model and infer conclusionsabout population/sample.
CO3	Able to Analyze hypothesis to accept/reject alternative hypothesis based on statistical evidence available.
CO4	Able to learn Programming Tools for Data Science
CO5	Solve real-world machine learning tasks from data to inference

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO 1	2	2	3	1	1	1	2	1	2	1	1	1
CO 2	3	3	2	3	2	2	1	2	2	2	2	3
CO 3	2	3	3	2	1	1	-	1	2	1	1	2
CO 4	3	2	2	2	2	2	1	2	2	2	1	3
CO 5	2	3	3	2	1	1	-	1	2	1	3	2

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Machine LearningCourse

Code: OEC702B Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Able to demonstrate the linear and logistic regression model.
CO2	: Able to describe the curse of dimensionality.
CO3	Able to identify the model of supervised learning.
CO4	Able to illustrate the artificial neural network to find the pattern in data.
CO5	Able to identify the model of unsupervised learning.

CO PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	2	2	1	1	1	1	1	3	3
CO2	3	3	2	1	3	2	-	-	1	1	3	3
CO3	1	3	3	3	2	1	2	2	-	2	3	3
CO4	3	3	2	2	3	2	-	1	2	1	3	3
CO5	2	3	2	3	1	1	1	1	-	2	3	3

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3
CO5	2	3	2

Course Name: Cyber Security &Cryptography

Course Code: OEC702C

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Acquire fundamental knowledge and compare different cryptographic techniques.
CO2	Develop and design various block cipher and stream cipher models
CO3	Demonstrate the principles of public key cryptosystems, hash functions anddigitalSignature.
CO4	Analyze varied network security tools and authentication applications
CO5	Develop and apply email security, IP security, web security services and mechanisms

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO 1	2	2	3	1	3	1	1	1	2	1	1	1
CO 2	2	2	3	3	1	-	-	1	2	1	1	3
CO 3	2	3	3	2	2	2	2	1	2	2	1	3
CO 4	3	2	3	2	1	-	-	1	2	1	1	3
CO 5	1	3	3	2	1	1	-	1	2	1	2	2

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Notmatched

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Advanced Bio Signal Processing

Course Code: OEC702D

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO 1	Able to illustrate filtering of biomedical signals, classify Time domain filtering, and design different types of filters.
CO 2	Able to analyze different component of ECG and EEG signals.
CO 3	Able to estimate the value of the transformation using wavelet transform.
CO 4	Able to describe the neurological signal processing and also describe adaptive interface and noise cancellation techniques.
CO 5	Able to estimate modeling of Biomedical systems.

CO-PO mapping:

COs \POs	PO 1	PO2	PO 3	PO4	PO 5	PO6	PO7	PO 8	PO9	PO1 0	PO1 1	PO1 2
CO1	2	2	2	1	3	1	2	2	3	3	2	2
CO2	3	3	3	3	2	1	1	1	2	2	3	3
CO3	3	2	2	2	1	1	3	1	3	1	3	1
CO4	3	3	3	1	2	1	1	3	2	2	2	3
CO5	2	3	2	2	2	1	1	1	2	3	3	2

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3
CO5	3	3	2

Course Name: Mixed Signal Design

Course Code: OEC702E

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Apply the concepts for mixed signal Mos circuit.
CO2	Demonstrate in-depth knowledge in Switched Capacitor Circuits, Data Converters –ADCand DAC, Filter and PLL.
CO3	Analyze the signal to noise ratio and modeling of mixed signals
CO4	Solve engineering problems responsibly with wide range of solutions toincrease Data Rate of DC and DAC for addressing social issues.
CO5	Contributepositivelytosocietywithmultidisciplinaryscientificresearchindesign and development of Mixed Integrated Circuits suited for wide range of applications.

CO-PO Mapping:

	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	3	3	1	1	2	2	1	3
CO2	3	1	2	2	3	2	2	-	2	1	2	2
CO3	2	2	1	2	2	1	1	-	3	2	3	3
CO4	2	2	2	2	3	2	2	3	2	1	2	1
CO5	3	3	3	2	2	2	1	3	2	1	1	3

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3
CO5	3	3	2

Course Name: Internet of Things Lab

Course Code: PEC791A

Contact: 0:0:3

Credits: 1.5

Course Outcome:

Graduates of the ECE program will be able to

CO1	understand internet of Things and its hardware and software components
CO2	interface I/O devices, sensors actuators and communication modules
CO3	Remotely monitor data and control devices
CO4	Develop real life IoT based projects

CO-PO Mapping:

	PO1	PO 2	PO3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO12
CO1	3	2	1	-	-	2	-	1	1	1	1	3
CO2	-	3	-	2	-	1	2	-	-	-	-	2
CO3	2	-	-	-	1	-	3	1	2	-	2	3
CO4	3	-	1	-	2	-	2	2	-	-	-	3

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Notmatched

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3
CO5	2	3	2

Course Name: Artificial Intelligence Lab

Course Code: PEC791B

Contact: 0:0:3

Credits: 1.5

Course Outcome:

Graduates of the ECE program will be able to

CO1	Apply PRPLOG to implement logic
CO2	Analyze searching algorithm
CO3	Apply ANN for classification
CO4	Apply NLP using AI.

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	2	-	1	1	1	1	3
CO2	-	3	-	2	-	1	2	-	2	1	-	2
CO3	2	-	-	-	1	-	3	2	1	2	2	3
CO4	3	-	1	-	2	-	2	-	-	-	-	3

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Notmatched

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-
CO5	-	-	-

Course Name: Digital Control System Lab

Course Code: PEC791C

Contact: 0:0:3

Credits: 1.5

Course Outcome:

Graduates of the ECE program will be able to

CO1	Conduct experiments on Position Control with proper tuning of P, PI and PID controller.
CO2	Demonstrate Lead-Lag Compensators.
CO3	Investigate the response of a Real Time System using State Variable Analysis.
CO4	Analyze Performance of Discrete-Time System a Non-Linear System.

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	2	2	2	2	1	2	1	3	3
CO2	3	2	2	3	2	1	-	-	2	-	1	2
CO3	3	3	3	3	3	2	1	-	2	-	1	2
CO4	2	3	2	2	3	2	-	2	2	2	3	3

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) =Not matched

CO-PSO Mapping

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Cloud Computing (AWS) Lab

Course Code: PEC791D

Contact: 0:0:3

Credits: 1.5

Course Outcome:

Graduates of the ECE program will be able to

CO1	Configure various virtualization tools such as Virtual Box, VMware workstation.
CO2	Design and deploy a web application in a PaaS environment.
CO3	Learn how to simulate a cloud environment to implement new schedulers.
CO4	Install and use a generic cloud environment that can be used as a private cloud.

CO- PO Mapping:

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

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weaklymatched, (-) = Not matched.

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: DATA SCIENCE LAB

Course Code: OEC 792A

Contact: 0:0:3

Credits: 1.5

Course Outcome:

Graduates of the ECE program will be able to

CO1	Understand the Python Programming Language.
CO2	Expose themselves on solving of data science problems.
CO3	Understand the classification and Regression Model.
CO4	Understand and apply principles of data visualization.
CO5	Set up Anaconda and Jupiter notebooks

CO- PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	-	-	-	1	2	2	1	2
CO2	3	2	1	2	2	-	-	1	2	2	1	2
CO3	3	3	1	1	2	-	-	1	2	1	1	2
CO4	3	3	3	2	2	1	1	1	3	2	2	3
CO5	3	2	1	1	-	-	-	-	1	1	1	2

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Not matched

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Machine Learning Lab

Course Code: OEC 792B

Contact: 0:0:3

Credits: 1.5

Course Outcome:

Graduates of the ECE program will be able to

CO1	Able to analyze linear regression model.
CO2	Able to evaluate the important features from data
CO3	Able to apply classifier to find the pattern from data.
CO4	Able to evaluate models generated from data.
CO5	Able to demonstrate the curse of dimensionality.

C0-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	3	2	2	-	1	1	2	3	2
CO2	2	3	3	2	3	1	1	-	-	1	2	3
CO3	3	3	3	2	3	2	-	-	1	1	3	2
CO4	2	2	2	3	2	1	2	2	-	2	2	3
CO5	3	3	3	3	3	2	-	-	2	1	3	3

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-)Not matched

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	-	3	3
CO2	-	3	3
CO3	-	3	2
CO4	-	3	3
CO5	-	3	2

Course Name: Cyber Security & Cryptography Lab

Course Code: OEC 792C

Contact: 0:0:3

Credits: 1.5

Course Outcome:

Graduates of the ECE program will be able to

CO1	Able to analyze the cipher technique
CO2	Able to apply Hash functions
CO3	Able to apply AES, DES algorithm
CO4	Able to analyze RS algorithm.

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO 1	2	2	3	1	3	1	1	1	2	1	1	1
CO 2	2	2	3	3	1	-	-	1	2	1	1	3
CO 3	2	3	3	2	2	2	2	1	2	2	1	3
CO 4	3	2	3	2	1	-	-	1	2	1	1	3

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) =Not matched

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Advanced Bio Signal ProcessingLab

Course Code: OEC 792D

Contact: 0:0:3

Credits: 1.5

Course Outcome:

Graduates of the ECE program will be able to

CO1	Analyze Bioelectric signals, human physiological system, and different types of transducers.
CO2	Design different types of medical measurement system.
CO3	Able to examine the data handling, filtering techniques of bio-medical signals and able to analysis of time and frequency domain.
CO4	Abletosimulatemedicalimagingtechniquesandimplementdifferentalgorithmstofeatureextract the signals.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	1	-	-	3	-	1	1	1	1	3
CO2	-	3	-	2	-	1	-	-	-	-	-	2
CO3	3	-	-	-	1	3	3	-	2	2	2	3
CO4	2	-	1	3	3	-	2	1	-	-	1	2

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weaklymatched, (-) = Not matched

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3

Course Name: Mixed Signal Design Lab

Course Code: OEC 792E

Contact: 0:0:3

Credits: 1.5

Course Outcome:

Graduates of the ECE program will be able to

CO1	Design and operation of the CMOS basic logic element and understanding of basic DC characteristics of the CMOS integrated circuits
CO2	Design of Switched Capacitor Circuits, Data Converters – ADC and DAC, Filter and PLL
CO3	Apply the knowledge of dc testing in MOS circuits, determination of signal to noise ratio and modeling of mixed signals
CO4	Solve engineering problems responsibly with wide range of solutions to increase Data Rate of ADCand DAC for addressing social issues.
CO5	Design of low pass and high pass active filters and study of its frequency response

CO-PO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	3	2	1	1	-	2	2	2	2
CO2	3	2	2	2	3	2	2	-	2	1	3	3
CO3	2	2	1	2	2	1	1	-	2	2	2	2
CO4	2	2	2	3	3	2	2	3	2	1	3	3
CO5	3	2	2	2	2	2	1	3	2	1	2	1

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Notmatched

CO-PSO Mapping:

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3
CO5	3	3	2

Course Name: Entrepreneurship & Innovation skill

Course Code: MC701

Contact: 2:0:0

Total Contact Hours: 24

Credits: 0

Course Outcome:

Graduates of the ECE program will be able to

CO1	Comprehend the role of bounded rationality, framing, causation and effectuation in entrepreneurial decision making.
CO2	Demonstrate an ability to design a business model canvas.
CO3	Evaluate the various sources of raising finance for startup ventures.
CO4	Explain the fundamentals of developing and presenting business pitching to potential investors.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	1	2	3	1	-	2	-	2	3	3
CO2	2	1	-	1	-	-	1	-	1	-	2	2
CO3	3	-	2	-	2	3	-	1	-	2	3	3
CO4	2	2	-	1	-	1	-	2	2	1	2	2

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Not matched

CO-PSO Mapping:

COs/PSOs	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Industrial Automation & Robotics

Course Code: PEC801A

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Identify different components of an automation system.
CO2	Interface the given I/O device with appropriate PLC
CO3	Prepare a PLC ladder program for the given application.
CO4	Gain knowledge of Elements of robots.
CO5	Calculate the forward kinematics and inverse kinematics of serial and parallel robots.
CO6	Able to do the motion planning & control for a robotic system.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	1	3	1	1	1	1	1	1	3
CO2	3	3	3	1	3	1	1	1	1	1	1	3
CO3	3	3	3	3	3	2	2	1	1	1	2	3
CO4	3	3	3	3	3	2	2	1	1	2	1	3
CO5	3	3	3	3	3	1	2	1	2	2	2	3
CO6	3	3	3	3	3	2	2	1	1	2	1	3

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Not matched.

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3
CO5	3	3	2
CO6	3	3	3

Course Name: Electronic System Design

Course Code: PEC801B

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Graduates will be able to design and analyze Analog Electronic Systems.
CO2	Graduates will be able to design and analyze Digital Electronic Systems.
CO3	Graduates will be able to design PCB for various Electronic Circuits.
CO4	Graduates will be able to find fault and test Electronic Systems

CO-PO Mappings:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	1	2	1	3	1	2	1	2
CO2	2	3	1	3	2	3	3	2	3	1	3	1
CO3	2	3	2	-	1	2	2	-	1	2	2	3
CO4	1	-	1	1	1	-	1	3	1	1	1	1

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Notmatched.

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3

Course Name: Automotive Electronics

Course Code: PEC801C

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Obtain an overview of automotive components, subsystems, design cycles, communication protocols and safety systems employed in today's automotive industry.
CO2	Interface automotive sensors and actuators with microcontrollers.
CO3	Develop, Simulate and Integrate control algorithms for ECUs with hardware.
CO4	Understand and explain fundamentals of automotive electrical and electronics systems.
CO5	Apply the various concepts of electrical and electronics to small vehicle system.
CO6	Analyze the design considerations of various engine control systems in automotive electrical andelectronics.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2	3	2	1	2	3	2	1	1	1
CO2	3	2	1	2	3	3	2	1	2	1	2	2
CO3	2	3	2	3	2	1	1	2	3	2	1	1
CO4	3	2	2	3	1	1	-	2	2	-	-	2
CO5	3	2	3	1	3	1	1	-	-	1	2	3
CO6	2	1	1	1	3	2	-	-	3	-	-	1

Weightage Values: (3) = Strongly Matched; (2) = Moderately Matched; (1) = Weakly Matched; (-) = Not Matched.

CO-PSO Mapping:

Cos/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3
CO5	3	3	2
CO6	3	3	3

Course Name: Adaptive Signal Processing

Course Code: PEC801D

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Learn the concept of adaptive signal processing and its applications
CO2	Understand the idea of Weiner filter.
CO3	Understand LMS and RLS algorithm.
CO4	Realize Lattice Filters and its realization.
CO5	Comprehend Kalman Filtering and its applications.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	2	-	-	-	-	1	3
CO2	1	3	-	2	-	1	2	1	1	-	-	3
CO3	2	-	-	1	1	-	3	-	-	1	2	3
CO4	3	-	1	-	2	-	2	1	2	-	-	3
CO5	2	3	-	2	-	1	2	1	1	-	-	3

Weightage Value: (3) = Strongly matched; (2) = Moderately matched; (1) = Weakly matched; (-) = Not matched.

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3
CO5	3	3	2

Course Name: Block ChainCourse

Code: OEC801A Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Define Block Chain Fundamentals.
CO2	Analyze Blockchain applications in a structured manner
CO3	Create own Crypto token.
CO4	Apply cryptocurrency exchanges and wallets safely.
CO5	Explain latest advances and its applications in Block Chain Technology.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	-	-	-	-	-	-	-
CO2	3	3	3	2	2	1	-	-	-	-	-	-
CO3	3	3	3	3	3	2	-	-	-	-	-	-
CO4	3	3	3	3	3	2	-	-	-	-	-	-
CO5	3	3	3	3	3	3	-	-	-	-	-	-

Weightage Value: (3) = Strongly matched; (2) = Moderately matched; (1) = Weakly matched; (-) = Notmatched.

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3

Course Name: Deep Learning

Course Code: OEC801B Contact:

3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Understand the basic concepts in Neural Networks and Deep Learning and applications.
CO2	Understand the Shallow & Deep Neural Networks.
CO3	Understand the Convolutional Neural Network models for Images.
CO4	Understand the Recurrent Neural Network models for Sequence data.

CO-PO Mappings:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	3	3	3	-	-	-	-	1	2	1
CO2	-	2	2	2	1	-	-	-	-	-	1	-
CO3	1	2	3	3	3	1	-	-	-	2	-	1
CO4	3	2	2	2	1	1	-	-	-	3	2	3

Weightage Value: (3) = Strongly matched; (2) = Moderately matched; (1) = Weakly matched; (-) =Not matched.

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Biology for Engineers

Course Code: OEC801C

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Understand the biological concepts from an engineering point of view.
CO2	Understand the concepts of biological sensing and its challenges.
CO3	Understand the process of human physiological system.
CO4	Integrate biological principles for developing next generation technologies.
CO5	Understand the Design of modern equipment and devices in bioengineering.
CO6	Understand the application of engineering principles and design concepts to medicine andbiology for healthcare purposes.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	-	-	-	2	-	-	-	-	-	-
CO2	1	2	-	-	-	2	-	-	-	-	-	1
CO3	2	2	3	1	-	2	2	-	-	-	-	-
CO4	3	1	3	1	3	3	-	-	-	-	-	-
CO5	2	2	2	1	3	2	-	-	-	-	-	-
CO6	3	2	2	1	-	2	2	-	-	-	-	-

Weightage Value: (3) = Strongly matched; (2) = Moderately matched; (1) = Weakly matched; (-) = Notmatched.

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3
CO5	3	3	3
CO6	3	3	3

Course Name: Foreign LanguageCourse

Code: OEC801D Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Read basic French and interpret the meaning
CO2	Construct simple sentences in French
CO3	Interact with others and hold simple conversations in French
CO4	Demonstrate a basic knowledge of French culture, manners, geography and world view

Mapping of Course:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	2	-	-	3	-	3	2	2	3	3	-	3
CO2	2	3	3	3	-	3	3	3	2	3	-	3
CO3	1	3	3	3	-	2	2	2	2	3	-	2
CO4	1	-	-	-	-	2	2	2	2	3	-	3

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	3	3

Course Name: Product Design & Manufacturing Processes

Course Code: OEC801E

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Understand the product design and development process.
CO2	Apply creative thinking skills for idea generation.
CO3	Translate conceptual ideas into products.
CO4	Present ideas using various types of models.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	1	-	-	-	-	-	-	-	-	-
CO2	3	2	1	2	2	2	-	-	-	-	-	-
CO3	2	3	3	3	2	1	-	-	-	-	-	-
CO4	3	2	3	2	3	2	-	-	-	-	-	-

Weightage Value: (3) = Strongly matched; (2) = Moderately matched; (1) = Weakly matched; (-) = Notmatched.

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3

Course Name: Business Research Method

Course Code: OEC801F

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Understand various kinds of research, objectives of doing research, research process research designsand sampling.
CO2	Formulate research problem and develop a sufficiently coherent research design.
CO3	Develop basic knowledge on qualitative, quantitative as well as measurement &scaling techniques.
CO4	Capable of writing and developing independent thinking for critically analyzing research reports.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	2	2	3	-	3	-	3	3
CO2	-	-	-	-	-	2	-	2	3	3	-	3
CO3	-	-	-	-	2	3	-	-	3	3	-	2
CO4	-	-	-	-	-	3	2	-	3	3	-	2

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Not matched.

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	2
CO4	3	3	3

Course Name: Essence of Indian Knowledge Tradition

Course Code: MC801

Contact: 3:0:0

Total Contact Hours: 36

Credits: 3

Course Outcome:

Graduates of the ECE program will be able to

CO1	Identify the concept of Traditional knowledge and its importance.
CO2	Explain the connection between Modern Science and Indian Knowledge System.
CO3	Understand the importance of Yoga for health care.
CO4	Interpret the effect of traditional knowledge on environment.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	2	1	-	-	-	2	3	3
CO2	3	2	-	1	3	2	-	1	2	-	3	3
CO3	3	2	2	-	2	3	1	-	2	1	3	3
CO4	3	1	-	2	-	-	-	2	-	3	3	3

Weightage Values: 3 = Strongly matched, 2 = Moderately matched, 1 = Weakly matched, (-) = Notmatched.

CO-PSO Mapping:

COs/PSOs	PSO 1	PSO 2	PSO 3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-