SRI INDU INSTITUTE OF ENGINEERING & TECHNOLOGY

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1. Geo Tag Photos of POs, PSOs, and PEOs

Department of ECE- Program Outcomes

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Sheriguda (V), Ibrahimpatnam (M), R.R. Dist., Hyderabad, TS- 501510.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
PROGRAM OUTCOMES

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, 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 safety, 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 modelling 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. ... ...BILITY: Understand the impact of the ... ...nding solutions in societal and environmental contexts, ... 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, 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.

Department of CSE(Program Outcomes)
Sri Indu Institute of Engineering and
Technology,Sheriguda, Ibrahimpatnam,Nagarjuna
Sagar Rd, , Telangana 501510, India
Lat N 17° 12' 35.0064" Long E 78° 36' 46.458"

Google

Department of CSE- Program Outcomes

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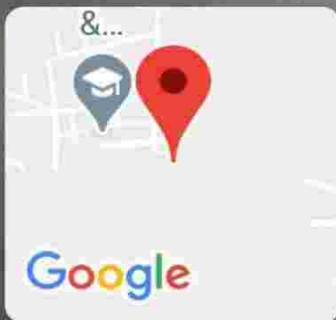Sheriguda (V), Ibrahimpatnam (M), R.R. Dist., Telangana-501 510.
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DEPARTMENT OF MECHANICAL ENGINEERING

PROGRAM OUTCOMES

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, 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 safety, 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 modelling 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, 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.

Department of Mechanical Engineering Program Outcomes

Sri Indu Institute of Engineering and Technology,Sheriguda, Ibrahimpatnam,Nagarjuna Sagar Rd, , Telangana 501510, India

Lat N 17° 12' 34.7616" Long E 78° 36' 45.4536"

Department of Mechanical Engineering - Program Outcomes

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DEPARTMENT OF CIVIL ENGINEERING

PROGRAM OUTCOMES

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, 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 safety, 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 modelling 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, 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.

Department of Civil Engineering Program Outcomes
Sri Indu Institute of Engineering and
Technology,Sheriguda, Ibrahimpatnam,Nagarjuna
Sagar Rd, , Telangana 501510, India
Lat N 17° 12' 35.0856" Long E 78° 36' 46.296"

Department of Civil Engineering - Program Outcomes

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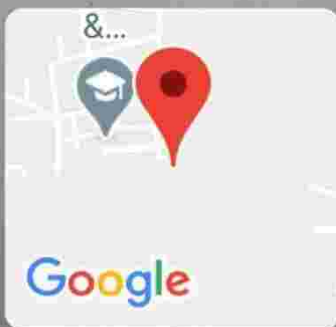Approved by AICTE, New Delhi and Affiliated to JNTUH.
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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

PEOs

PROGRAM EDUCATIONAL OBJECTIVES ARE TO PROMOTE:

PEO1 : Graduates with a strong foundation in Electronics and Communication Engineering, Science and Technology to become successful in the chosen professional career.

PEO2 : Graduates with ability to execute innovative ideas for Research and Development with continuous learning.

PEO3 : Graduates inculcated with industry based soft skills to enable employability.

PEO4 : Graduates demonstrate with ability to work in interdisciplinary teams and ethical professional behavior.

PSOs

PPROGRAM SPECIFIC OUTCOMES

PSO1 : Design Skills: Design, analysis and development a economical system in the area of Embedded system & VLSI design.

PSO2 : Software Usage: Ability to investigate and solve the engineering problems using MATLAB, Keil and Xilinx.
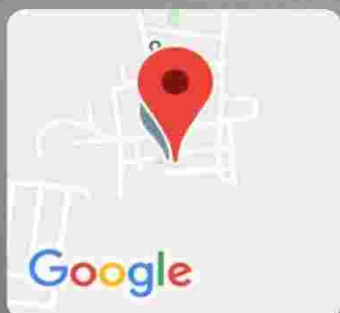
ECE Department (PEOs & PSOs)
Sri Indu Institute of Engineering and Technology
Sheriguda, Ibrahimpatnam, Hyderabad -
Nagarjuna Sagar Rd, Telangana 501510, India
Lat N 17° 12' 36.4392" Long E 78° 36' 43.2288"

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Department of ECE – PEOs & PSOs

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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PEOs

PROGRAM EDUCATIONAL OBJECTIVES

PEO1 : To develop trained graduates with strong academic and technical skills of modern Computer Science and Engineering.

PEO2 : To promote _____ with leadership qualities and the ability to solve real time p_____ techniques and tools in inter-disciplinary environment.

PEO3 : To motivate the graduates towards lifelong learning through continuing education and professional development.

PSOs

PROGRAM SPECIFIC OUTCOMES

PSO1 : Professional Skills: To implement computer programs of varying complexity in the areas related to Web Design, Cloud Computing, Network Security and Artificial Intelligence.

PSO2 : Problem-Solving Skills: To develop quality products using open ended programming environment.

Department of CSE(PEOs & PSOs)
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Department of CSE – PEOs & PSOs

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Department of Mechanical Engineering – PEOs & PSOs

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DEPARTMENT OF CIVIL ENGINEERING
PEOs

PROGRAMME EDUCATIONAL OBJECTIVES :

PEO1 : To provide the students with a strong foundation in the basic Sciences and Mathematics that will enable them to identify and solve real time problems in Civil engineering for Industries and Research activities.

PEO2 : To provide opportunity for students to work as part of teams on multidisciplinary projects. Students shall have relevant engineering design experience so that they shall understand the relationship between theory and practice for Core Subjects.

PEO3 : To adopt new innovative technology by continuously updating their knowledge through lifelong learning achieving personal and organization growth.

PSOs

PROGRAMME SPECIFIC OUTCOMES :

PSO1 : Graduates will be able to apply technical skills and modern engineering tools for civil engineering day to day practice.

PSO2 : Graduates will be able to design civil engineering structures, components and process to meet desired needs with appropriate consideration for the public health and safety, cultural, societal, sustainability and environmental considerations.

Department of Civil Engineering(PEOs & PSOs)
Sri Indu Institute of Engineering and
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Lat N 17° 12' 35.0712" Long E 78° 36' 46.2852"

Department of Civil Engineering – PEOs & PSO

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2. Geo Tag Photos of COs Displayed in the Department Notice Boards

COs Displayed in the ECE Department Notice Board

COs Displayed in the CSE Department Notice Board

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COs Displayed in the Mechanical Department Notice Board

COs Displayed in the H&S Department Notice Board

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COs Displayed in the Civil Department Notice Board

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3. Screenshots of POs, PEOs, PSOs and COs uploaded in the college website.

ECE Department PEOs in the website

CSE Department PEOs in the website

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CIVIL Department PEOs in the website

Mechanical Department PEOs in the website

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POs in the ECE Department Website Page

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POs in the Civil Department Website Page

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POs in the Mechanical Department Website Page
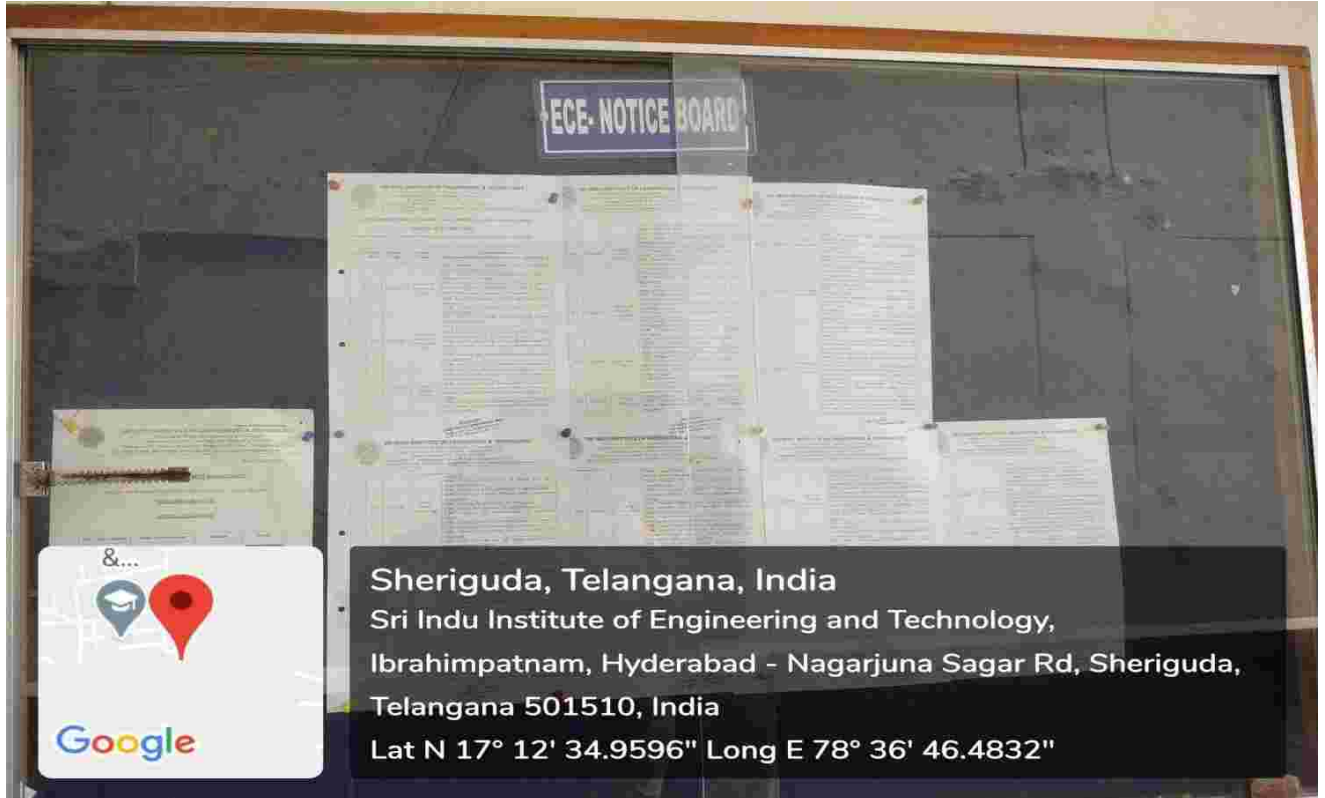
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ECE Department PSOs in the website

CSE Department PSOs in the website

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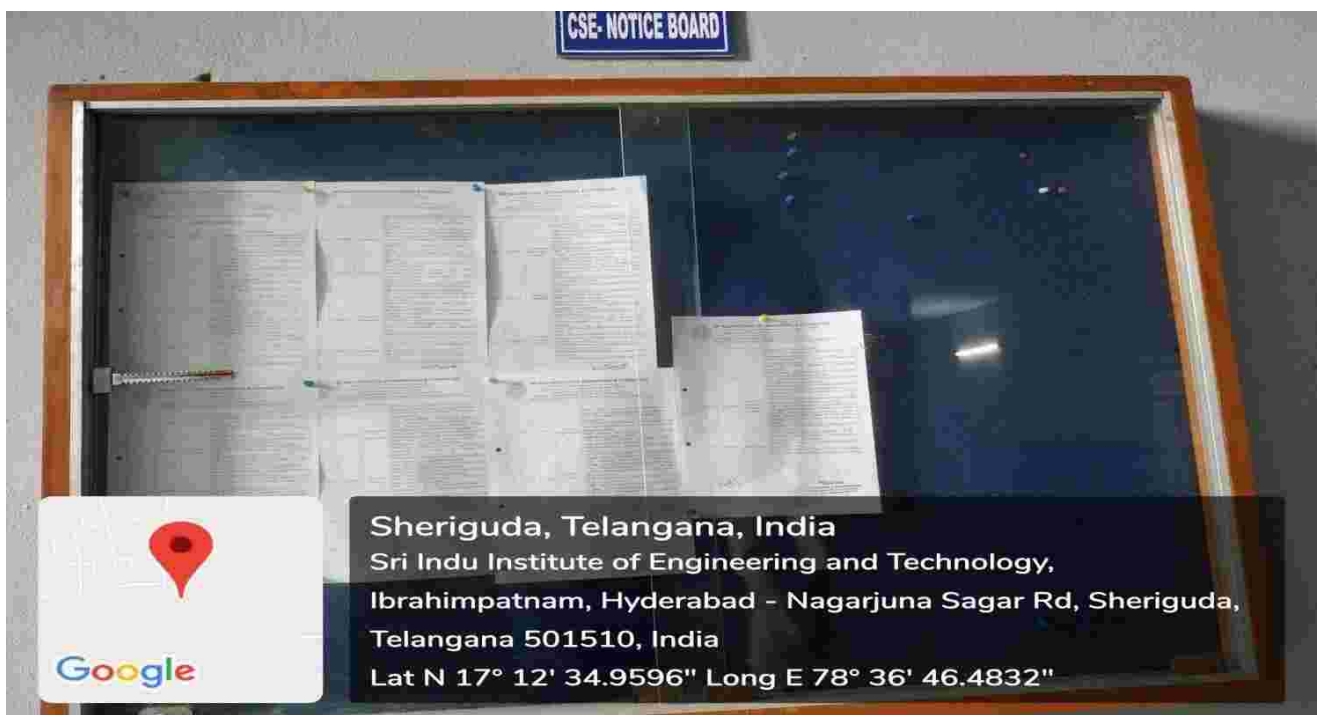Recognized under 2(f) of UGC Act 1956.
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CIVIL Department PSOs in the website

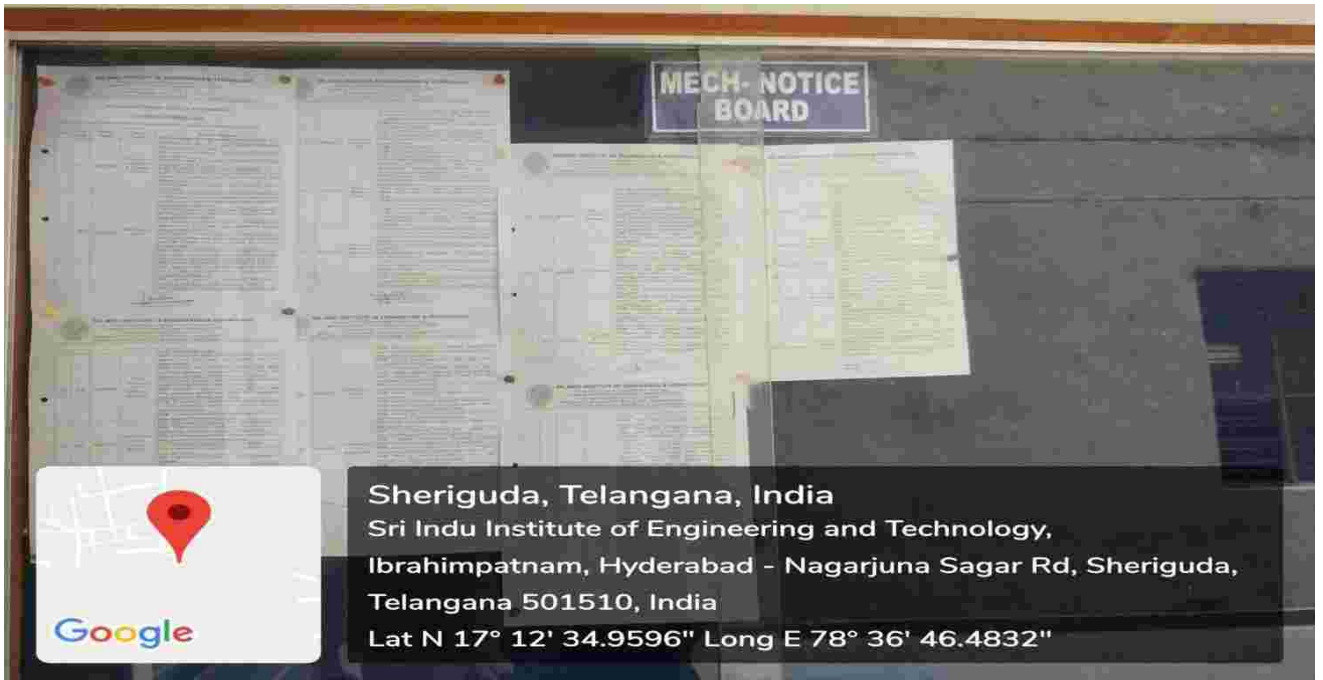**MECHANICAL Department PSOs in the website**

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ECE Department COs in the website

CSE Department COs in the website

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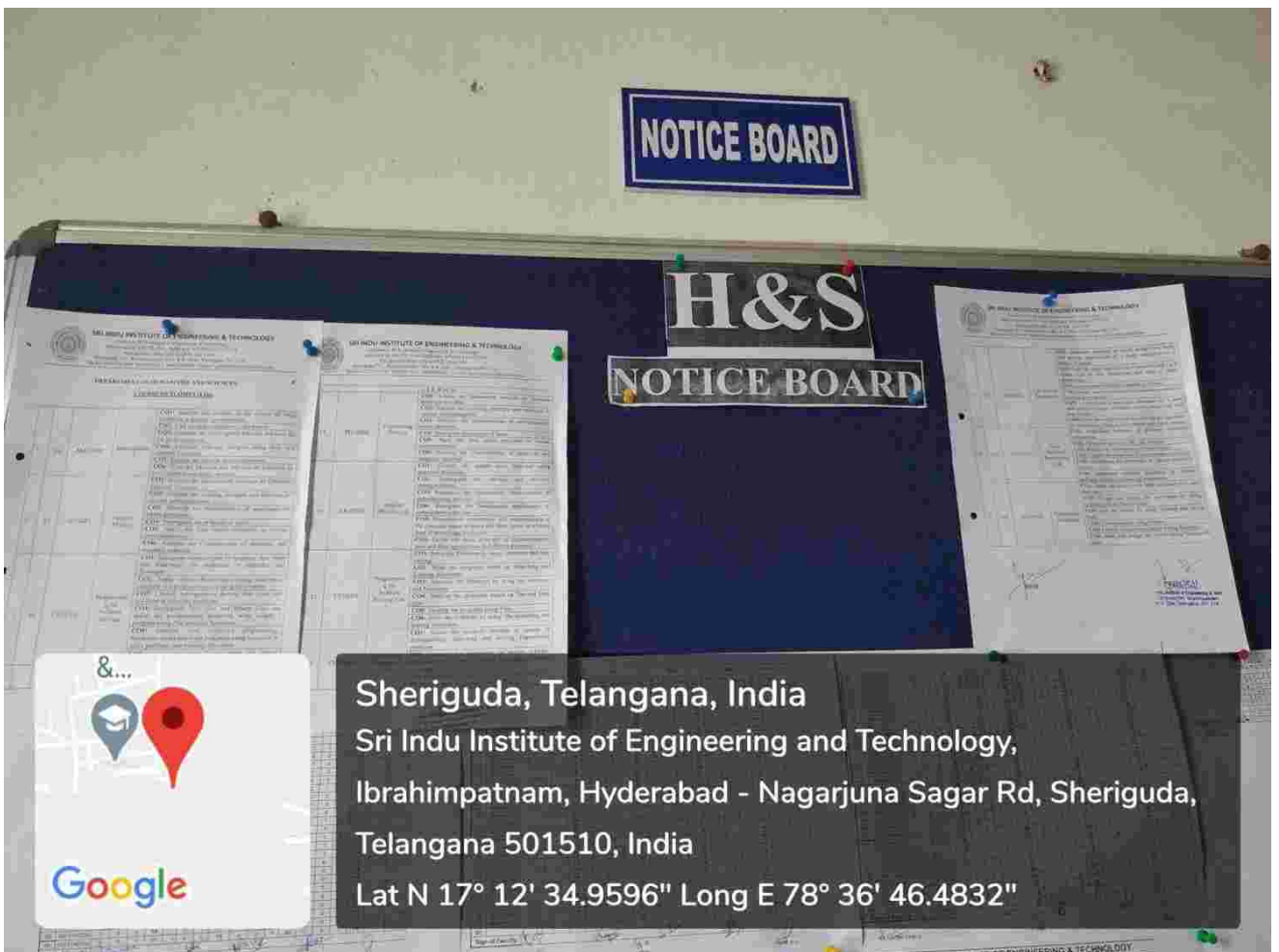Approved by AICTE, New Delhi and Affiliated to JNTUH.
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CIVIL Department COs in the website

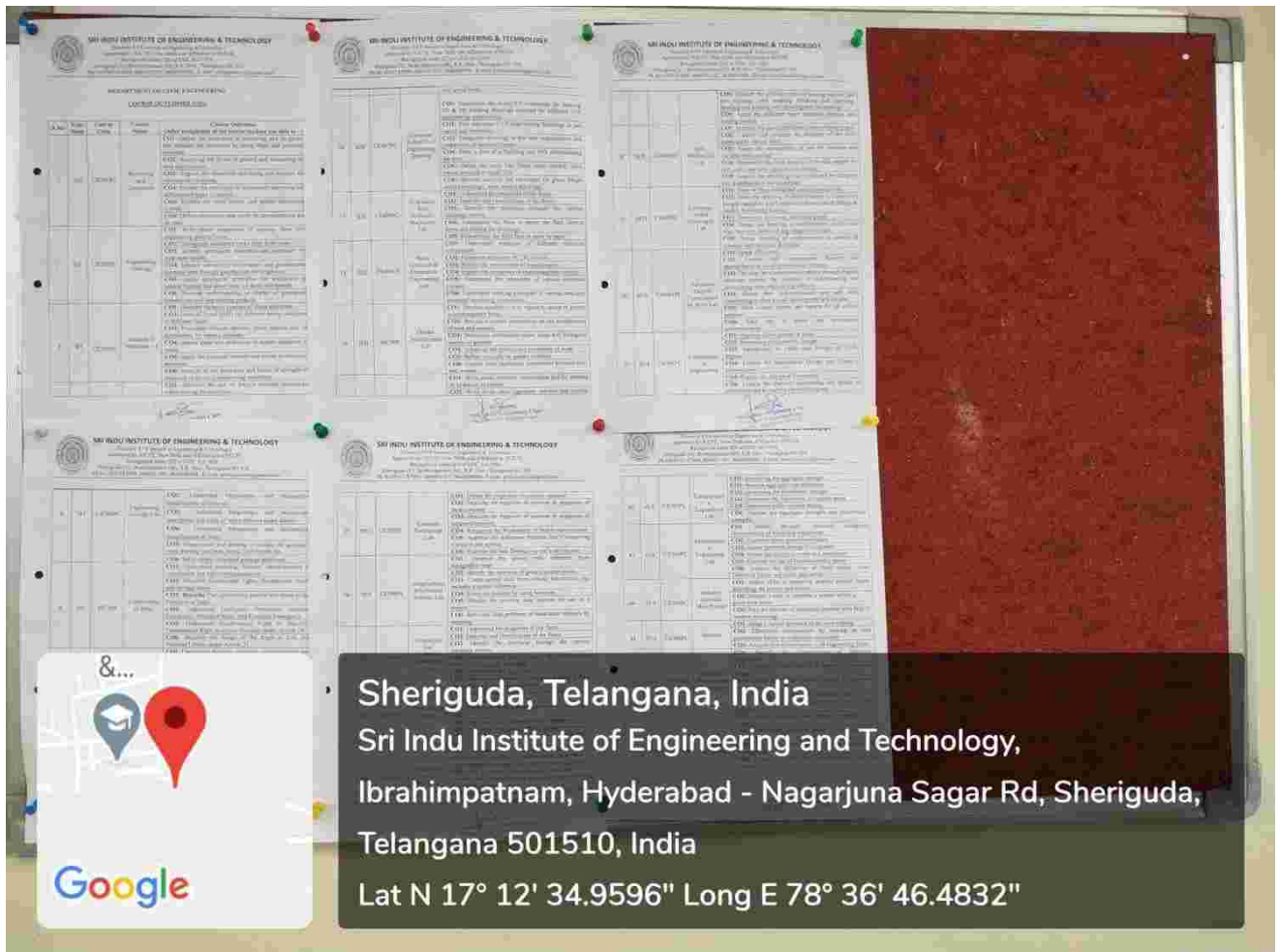**MECHANICAL Department COs in the website**

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First Year COs in the H&S department website

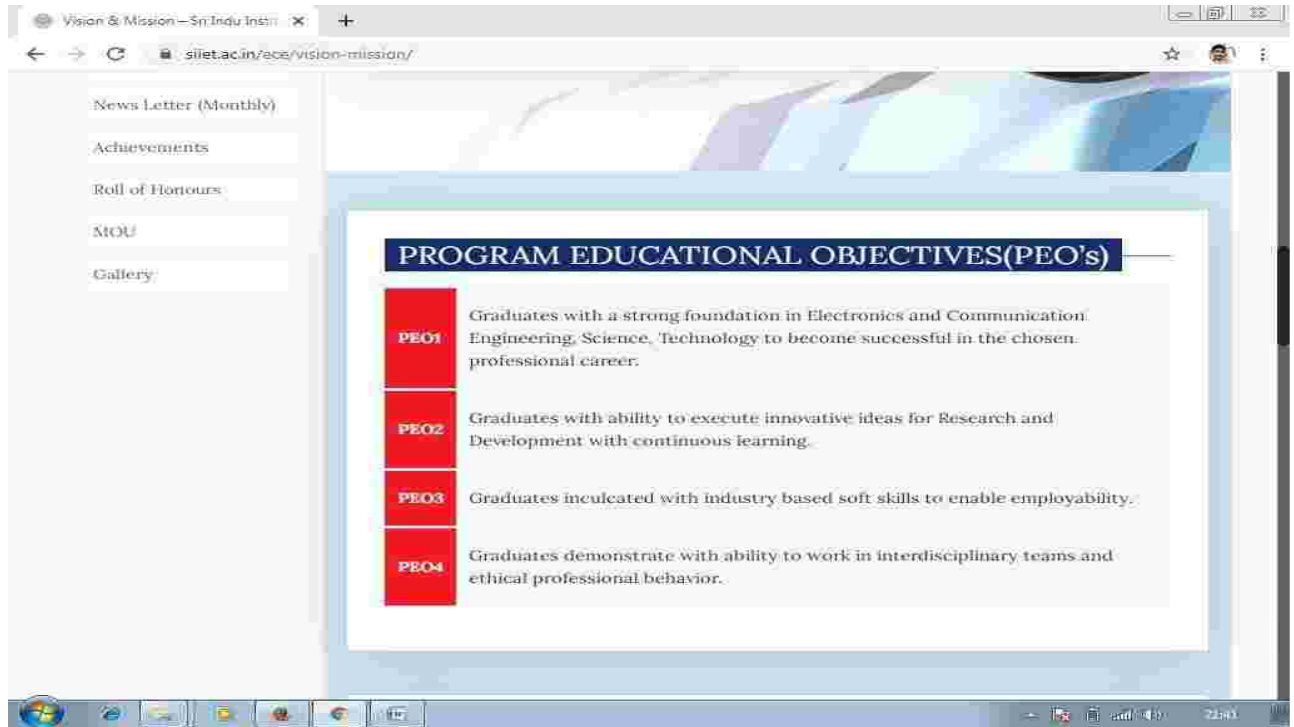**SRI INDU INSTITUTE OF ENGINEERING & TECHNOLOGY**

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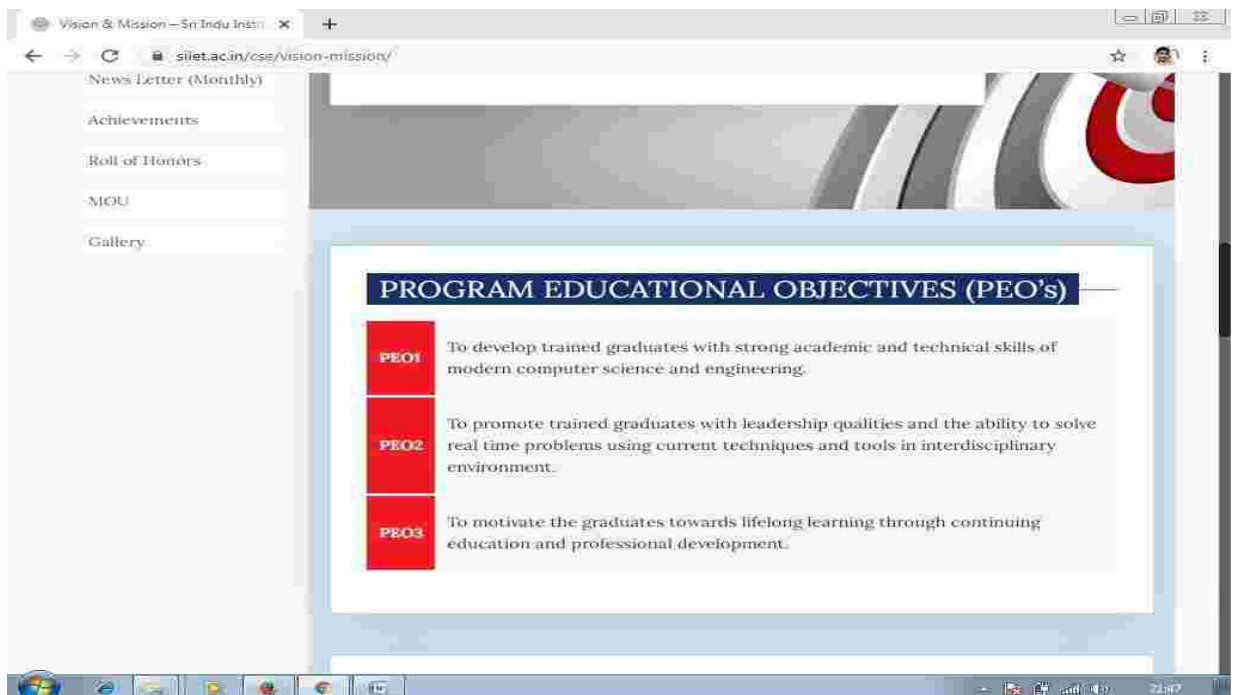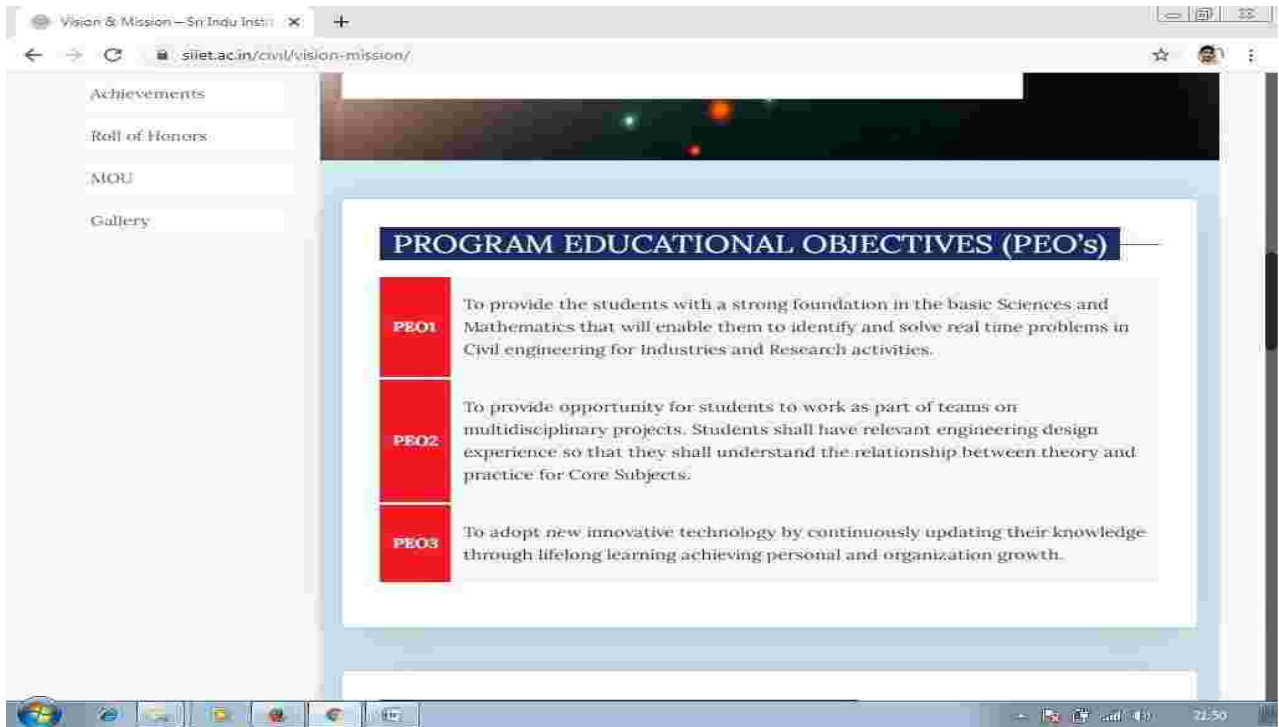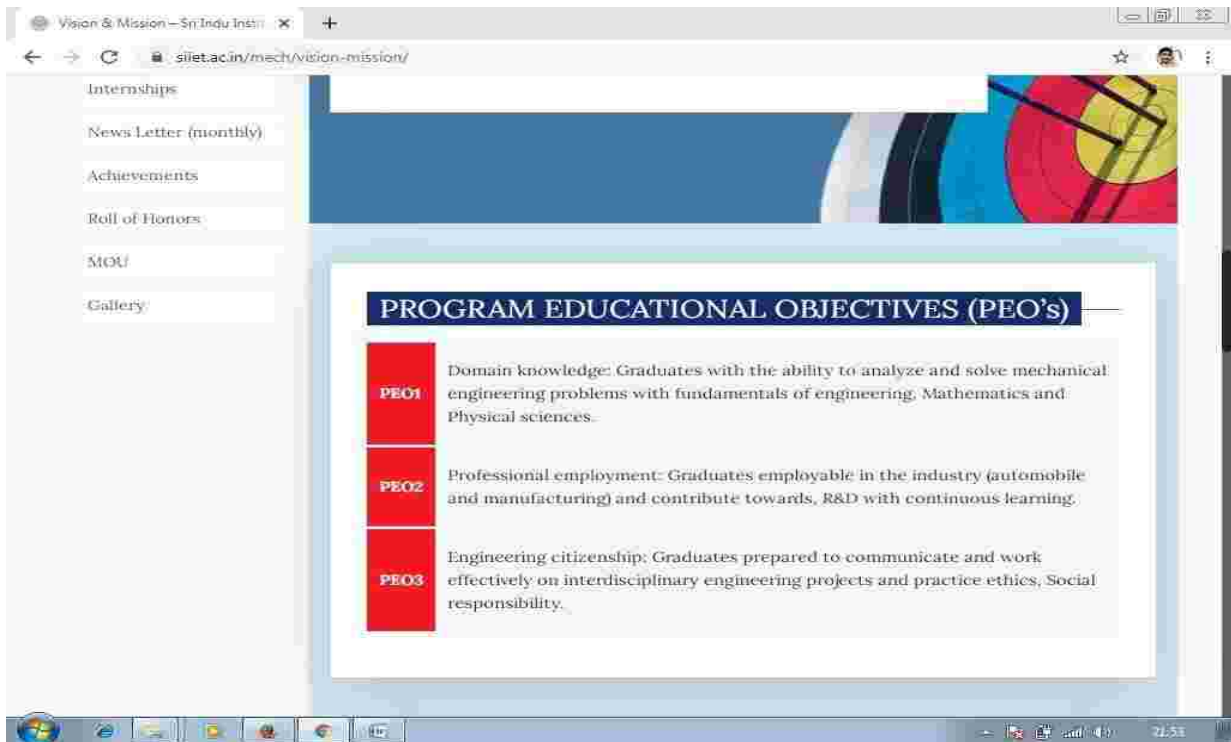
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4. Program Outcomes (POs), Program Specific Outcomes, Program Educational Objectives (PEOs) and Course Outcomes (COs) of all the courses:-

PROGRAM OUTCOMES (POs):

Program Outcomes (POs) describe what students are expected to know and be able to do by the time of graduation. The program outcomes are:

PO1: ENGINEERING KNOWLEDGE: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: PROBLEM ANALYSIS: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: 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.

PO4: 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.

PO5: MODERN TOOL USAGE: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: 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.

PO7: 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.

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

PO9: INDIVIDUAL AND TEAM WORK: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: COMMUNICATION: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write

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effective reports and design documentation, make effective presentations, give and receive clear instructions.

PO11: 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.

PO12: 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.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

Program Educational Objectives (PEOs) describe the career and professional accomplishments that programs are preparing graduates to attain within a few years of graduation.

The B.Tech. in Electronics and Communications Engineering (ECE) program has the following Program Educational Objectives.

PEO1 : Graduates with a strong foundation in Electronics and Communication Engineering, Science and Technology to become successful in the chosen professional career.

PEO2 : Graduates with ability to execute innovative ideas for Research and Development with continuous learning.

PEO3 : Graduates inculcated with industry based soft-skills to enable employability.

PEO4 : Graduates demonstrate with ability to work in interdisciplinary teams and ethical professional behaviour.

The B.Tech. in Computer Science and Engineering (CSE) program has the following Program Educational Objectives.

PEO1 : To develop trained graduates with strong academic and technical skills of modern computer science and engineering.

PEO2 : To promote trained graduates with leadership qualities and the ability to solve real time problems using current techniques and tools in interdisciplinary environment.

PEO3 : To motivate the graduates towards lifelong learning through continuing education and professional development.

The B.Tech. in Mechanical Engineering(MECH) program has the following Program Educational Objectives.

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PEO1 : Domain Knowledge: Graduates with the ability to analyze and solve mechanical engineering problems with fundamentals of engineering, Mathematics and Physical sciences.

PEO2 : Professional Employment: Graduates employable in the industry (automobile and manufacturing) and contribute towards, R&D with continuous learning.

PEO3 : Engineering Citizenship: Graduates prepared to communicate and work effectively on interdisciplinary engineering projects and practice ethics, social responsibility.

The B.Tech. in Civil Engineering (CE) program has the following Program Educational Objectives.

PEO1 : To provide the students with a strong foundation in the basic sciences and mathematics that will enable them to identify and solve real time problems in civil engineering for industries and research activities.

PEO2 : To provide opportunity for students to work as part of teams on multidisciplinary projects. Students shall have relevant engineering design experience so that they shall understand the relationship between theory and practice for core subjects.

PEO3 : To adopt new innovative technology by continuously updating their knowledge through lifelong learning achieving personal and organization growth.

PROGRAM SPECIFIC OBJECTIVES (PSOs):

Program Specific Outcomes (PSOs) describes that what students can able to do after completion of the program.

The B.Tech. in Electronics and Communication Engineering(ECE) program has the following Program Specific Objectives.

PSO1 : Design Skills: Design, analysis and development a economical system in the area of Embedded system & VLSI design.

PSO2 : Software Usage: Ability to investigate and solve the engineering problems using MATLAB, Keil and Xilinx.

The B.Tech. in Computer Science Engineering (CSE) program has the following Program Specific Objectives.

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PSO1 : Professional Skills: To implement computer programs of varying complexity in the areas related to Web Design, Cloud Computing, Network Security and Artificial Intelligence.

PSO2: Problem-Solving Skills: To develop quality products using open ended programming environment.

The B.Tech. in Mechanical Engineering (MECH) program has the following Program Specific Objectives.

PSO1 : Able to design, analyze manufacturing processes, Thermal systems and Industrial engineering.

PSO2: Ability to use the drafting software like AUTO CAD / CATIA / PRO E / CREO and ANSYS for design and analyze the automobile and aeronautical components.

The B.Tech. in Civil Engineering (CE) program has the following Program Specific Objectives.

PSO1 : Graduates will be able to apply technical skills and modern engineering tools for civil engineering day to day practice.

PSO2: Graduates will be able to design civil engineering structures, component or process to meet desired needs with appropriate consideration for the public health and safety, cultural, societal, sustainability and environmental considerations.

COURSE OUTCOMES (COs):

Course Outcomes (COs) describe what students can able to do after completion of the course.

Program : B.Tech-Electronics and Communication Engineering	Academic Year : 2020-21	Semester : I & II

S.No	Year/ Sem	Course Code	Course Name	Course Outcomes (After completion of the course student can able to :)
1	II/I	EC301PC	Electronic Devices & Circuits	**CO1:** Describe the applications of diode as rectifier, clippers, and clamper circuits.
				CO2: Design various switching devices such as transistor, transistor biasing.
				CO3: Analyse the operation of FET, special devices like Zener, Tunnel, Varactor diode, UJT and SCR.
				CO4: Define explain transistor hybrid model.
				CO5: Draw the operation of small signal model FET operation.
				CO6: Explain the operation of diodes, BJT, FET,

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				Transistor amplifiers.
2	II/I	EC302PC	Network Analysis and Transmission Lines	**CO1:** Gain the knowledge on basic network elements and magnetic circuits.
				CO2: Analyze the RLC circuits in detail.
				CO3: Gain the knowledge in characteristics of two port network parameters (Z, Y, ABCD, H & G).
				CO4: Gain the knowledge in network function driving point in transfer function using s variables, poles and zeros.
				CO5: Analyze the transmission line parameters and configurations.
				CO6: Analyze smith chart configuration & applications.
3	II/I	EC303PC	Digital System Design	**CO1:** State the Boolean algebra, different number systems and codes. Change one number system into another number system.
				CO2: Design the different combinational logic circuits. Modify and transform one form of Boolean equation to another form and simplify the Boolean equation in K-Map.
				CO3: Design the different Sequential circuits. Analyze and compare the flipflops and transform one flipflop to another flipflop.
				CO4: Design synchronous and asynchronous counters. Analyze and differentiate the sequential machine.
				CO5: Define, Differentiate between logic families and realization of logic gates using diodes and transistors
				CO6: Design the digital system.
4	II/I	EC304PC	Signals and Systems	**CO1:** Explain any arbitrary signals in terms of complete sets of orthogonal functions and understands the principles of impulse functions, step function and signum function.
				CO2: Express periodic signals in terms of Fourier series and express the spectrum and express the arbitrary signal (discrete) as Fourier transform to draw the spectrum.
				CO3: Analyze the characteristics of linear time invariant systems.
				CO4: Explain response can be obtained using Laplace transform and Z- Transform, properties and ROC of L.T and Z- Transform.
				CO5: Analyze the Sampling theorem, reconstruction, aliasing, and Nyquist's theorem to represent continuous time signals in discrete time.
				CO6: Compare auto Correlation and cross correlation and concept of power density spectrum.
5	II/I	EC305ES	Probability Theory and	**CO1:** Attain the knowledge of Probability theory and random variables.

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			Stochastic Processes	**CO2:** Explain the Vector Random variables and joint distribution function.
				CO3: Understand the response of linear time Invariant system for a Random Processes.
				CO4: Analyze the random variable and random process, its properties.
				CO5: Determine the Spectral and temporal characteristics of Random Signals.
				CO6: Analyze the concepts of Noise in Communication systems.
6	II/I	EC306PC	Electronic Devices & Circuits Lab	**CO1:** Describe the applications of diode as rectifier, clippers and clamper circuit.
				CO2: Design various switching devices such as transistor, transistor biasing.
				CO3: Analyze the operation of FET, Special devices like Zener, Tunnel. Varactor diode, UJT, SCR.
				CO4: Define explain transistor hybrid model.
				CO5: Draw the operation of small signal model FET operation.
				CO6: Examine the operation of diodes, BJT, FET, Transistor amplifiers.
7	II/I	EC307PC	Digital System Design Lab	**CO1:** Identify the IC configurations of digital circuits.
				CO2: Verify and compare different types of gates and comparators.
				CO3: Develop the clock using universal gates.
				CO4: Design and realization of sequential circuits.
				CO5: Analyze and implementation of sequential circuits.
				CO6: Compare combinational and sequential circuits.
8	II/I	EC308ES	Basic Simulation Lab	**CO1:** Identify the basic operations on matrices.
				CO2: Identify and Analyze the various signals and sequences.
				CO3: Point out even and odd signals and real and imaginary parts of signals.
				CO4: Construct the convolution for signals and sequence, Linear-Non linear and time variant-Invariant of sequences.
				CO5: Compare the auto correlation, cross correlation.
				CO6: Describe sampling.
				CO6: Express the Fourier transform and Laplace transform.
9	II/I	MC309	Constitution of India	**CO1:** Understand meaning, features, characteristics of constitution law and constitutionalism.
				CO2: Describe fundamental rights, fundamental duties and its legal status.
				CO3: **Describe** The constitution powers and status of the President of India.
				CO4: Understand Emergency Provisions: National

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				Emergency, President Rule, And Financial Emergency.
				CO5: Understand Fundamental Right to Equality, Fundamental Right to certain Freedom under Article 19.
				CO6: Describe the Scope of the Right to Life and Personal Liberty under Article 21.
10	II/II	MA401BS	Laplace Transforms, Numerical Methods & Complex Variables	**CO1**: Describe the use of Laplace Transform techniques when solving ordinary differential equations.
				CO2: Solve the polynomial and transcendental equations.
				CO3: Determine the Numerical solutions for given ordinary differential equations.
				CO4: Identify the Differential Numerical Methods.
				CO5: Describe the Complex function with their analyticity, integration using Cauchy's Integral and Residue theorems.
				CO6: Discuss the Taylor's and Laurent series expansions.
11	II/II	EC402PC	Electromagnetic Fields and Waves	**CO1:** Apply the basic laws to derive the Maxwell's Equation in Differential and Integral form for solving the engineering problems in Electrostatics.
				CO2: Describe the knowledge of Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law.
				CO3: Distinguish between static and Time varying fields, apply these concepts to derive the Maxwell's Equation in Differential, Integral form and boundary conditions for solving the engineering problems.
				CO4: Analyze the wave equation for good conductors and good dielectrics, criticize and apply the characteristics of uniform plane wave for practical problems.
				CO5: To analyze the characteristics of Uniform Plane Waves (UPW), determine their propagation parameters and estimate the same for dielectric and dissipative media.
				CO6: Analyze the rectangular waveguides, their mode characteristics, and design waveguides for solving practical problems.
12	II/II	EC403PC	Analog and Digital Communications	**CO1:** Design various continuous wave modulation and demodulation techniques.
				CO2: Analyze Frequency Modulation (FM) Techniques.
				CO3: Analyze Phase Modulation (PM) Techniques.
				CO4: Design various AM and FM transmitters.
				CO5: Describe various Pulse Modulation Techniques.
				CO6: Analyze various digital modulation techniques and baseband transmission.
13	II/II	EC404PC	Linear IC Applications	**CO1:** Describe the characteristics of Operational Amplifier with linear integrated circuits.
				CO2: Analyze the different applications of Operational

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				Amplifier.
				CO3: Produce the different wave forms of filters and oscillators.
				CO4: Describe the functional diagrams and applications of IC 555 & IC 565.
				CO5: Explain various techniques to design analog to digital converters and digital to analog converters.
				CO6: Design the linear integrated circuits using operational Amplifier.
14	II/II	EC405PC	Electronic Circuit Analysis	**CO1:** Design the multistage amplifiers and develop& analyze transistor amplifier circuits using Hybrid π model at high frequencies.
				CO2: Design of Feedback amplifiers and their frequency response.
				CO3: Understand the design of various oscillators such as RC Phase Shift Oscillator, Wein Bridge Oscillator, Crystal, LC oscillator.
				CO4: Design and compare various Power amplifiers such as Class A, Class B, Class AB amplifiers, Analysis of various tuned amplifiers etc.
				CO5: Design Multivibrators.
				CO6: Understand sweep circuits for various applications.
15	II/II	EC406PC	Analog and Digital Communications Lab	**CO1:** Identify the basics of analog and digital communication systems.
				CO2: Design and Implement different modulation and demodulation techniques.
				CO3: Analyze and implement analog to digital, digital to analogy converters.
				CO4: Describe practical implementation of baseband modulation techniques.
				CO5: Design and implement different pulse modulation techniques like PAM, PWM and PPM.
				CO6: Compare analog and digital modulation techniques.
16	II/II	EC407PC	IC Applications Lab	**CO1:** Design inverting and non inverting, adder and subtractor or amplifier using op-amp.
				CO2: Verify a comparator, Integrator and Differentiator using op-amp and voltage regulator using IC723.
				CO3: Design active filters, PLL.
				CO4: Analysis of IC741 waveform generator sine, square, triangular waves.
				CO5: Design a Monostable, Astable Multivibrator and Schmitt trigger.
				CO6: Identify and verify the functionalities of the linear integrated circuits.
17	II/II		Electronic	**CO1:** Design and simulate different BJT amplifiers: CE amplifier, Two stage RC coupled amplifier, Cascode, Darlington pair.

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		EC408PC	Circuit Analysis Lab	**CO2:** Design and simulate feedback amplifiers: Current shunt feedback amplifier, Voltage series feedback amplifiers.
				CO3: Design and simulate different oscillators: RC phase shift oscillator, Hartley and colpitt's oscillators.
				CO4: Design and simulate power amplifiers: Class A power amplifier, Class B complementary symmetry amplifier.
				CO5: Design Monostable Multivibrator.
				CO6: Design Miller sweep circuit.
18	II/II	EC408PC	Gender Sensitization Lab	**CO1:** Develop sensibility with regard to issues of gender in contemporary India.
				CO2: Provide a critical perspective on the socialization of men and women.
				CO3: Determine information about some key biological aspects of genders.
				CO4: Debate on the politics and economics of work.
				CO5: Reflect critically on gender violence.
				CO6: Expose more egalitarian interactions between men and women.
19	III/I	. EC501PC	Microprocessors & Microcontrollers	**CO1**: Basic understanding of 8086 microprocessors architectures and its functionalities.
				CO2: Design and develop 8086 Microprocessor based systems for real time applications using low level language like ALP.
				CO3: Basic understanding of 8051 microcontroller's architectures and its functionalities.
				CO4: Discuss the input /output memory interface Serial Communication and Bus Interface device.
				CO5: Analyze the internal architecture of ARM.
				CO6: Classify the internal architecture of CORTEX ARM Processor and MAP ARM Processor.
20	III/I	EC502PC	Data Communications and Networks	**CO1:** Explain conceptual foundation for study of data communication using layered architecture.
				CO2: Analyze network Interface protocol and Design Performance issues in MAC in DLL.
				CO3: Evaluate the functioning of routing algorithm and internetworking.
				CO4: Analyze reliable transmission and analyze the performance of TCP protocols.
				CO5: Demonstrate the significance of various flow control and congestion control mechanisms.
				CO6: Analyze the features and operation of various application layer protocols such as Http, DNS &STMP.
21	III/I	EC503PC	Control Systems	**CO1:** Create mathematical model using Laplace Transform and define the Transfer Function of an LTI system in various ways.
				CO2: Analyze the response of First and second order

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				systems in time domain using characteristic Equations for feedback control systems, and also evaluate the stability of a system in Time Domain using RH Criterion and Root Locus.
				CO3: Examine Frequency response analysis of a Control System and Solve the stability of the system using BODE Plots.
				CO4: Analyze the stability of a system in frequency domain using polar and Nyquist's plots.
				CO5: Design and implementation of Compensators and Controllers to improve stability.
				CO6: Design state model of a system and determine the transfer function for Linear Time Variant Systems.
22	III/I	SM504MS	Business Economics & Financial Analysis	**CO1:** The students will understand various forms of Business and the impact of economic variables on the business.
				CO2: Understand the significance of elasticity of demand and its forecasting, law of demand and its exceptions and supply analysis.
				CO3: Understand production analysis function with different variables and cost analysis functions.
				CO4: To adopt the principles of accounting to record, classify and summarize various transactions in books of accounts for preparation of final accounts.
				CO5: Understand the Ratio analysis to give an idea about financial forecasting, financial planning, controlling and decision making.
				CO6: Understand the implementation of different structures of markets covering how price-output is determined under different market structures.
23	III/I	EC511PE	Computer Organization and Operation Systems (Professional Elective-I)	**CO1:** Visualize the organization of different blocks in a computer.
				CO2: Understand micro programmed control and the memory system.
				CO3: Analyze input and output organization of a computer.
				CO4: Describe different serial communication protocols.
				CO5: Analyze the overview of a operating system.
				CO6: Understand file system interface.
28	III/II	EC601PC	Antennas and Propagation	**CO1:** Characterize the antennas based on frequency.
				CO2: Identify the antenna array patterns.
				CO3: Understand the concept of antenna measurements.
				CO4: Design VHF, UHF and microwave antennas.
				CO5: Analyze micro strip antennas.
				CO6: Characterize different wave propagations.
29	III/II		Digital Signal Processing	**CO1:** Understand the LTI system characteristics and Multi rate signal processing.
				CO2: Understand the inter-relationship between DFT

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		EC602PC		and various transforms.
				CO3: Design IIR digital filters for a given specification.
				CO4: Design FIR digital filters for a given specification.
				CO5: Express Z -transform analysis on signals and systems.
				CO6: Understand the significance of various filter structures and effects of round off errors.
30	III/II	EC603PC	VLSI Design	**CO1:** Acquire knowledge of the Fabrication of IC using various MOS circuits and can be able to compute electrical properties of MOS circuits.
				CO2: Understand vlsi design flow and design rules for layout of IC.
				CO3: Design various gates, adders, Multipliers and Memories using stick diagrams, layouts.
				CO4: Design various forms of memories.
				CO5: Demonstrate semiconductor IC design such as PLA's, PAL, FPGA, CPLDs.
				CO6: Understand differential strategies for testing of IC's and CMOS.
31	III/II	EC613PE	Embedded System Design (Professional Elective – II)	**CO1:** Describe the basics of an embedded system.
				CO2: Interpret the types of memory and interfacing to external world.
				CO3: Analyze the embedded firmware design approaches.
				CO4: Design the RTOS based embedded system for multitasking.
				CO5: Express the task communication/synchronization issues.
				CO6: Assess the method of designing an embedded system for any type of application.
32	III/II	EI711OE	Basics of Sensors Technology (Open Elective – I)	**CO1:** Define Measurement system and types of passive sensors.
				CO2: Identify suitable Active sensors and transducers for real time applications.
				CO3: Solve the different type of velocities.
				CO4: Transform theoretical concepts of consistency and viscosity into working Models.
				CO5: Describe calibration and calibration using different types of sensor.
				CO6: Prepare the skill base summary to further explore advance the topics of Basics of sensor Technology.
33	IV/I	Microwave Engineering / EC701PC		**CO1:** Recognize the microwave bands, applications and rectangular waveguides.
				CO2: Analyze the waveguide components and cavity resonators.
				CO3: Classify O type and M type microwave tubes.
				CO4: Explain the microwave solid state devices and applications.

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				CO5: Illustrate microwave measurements by using microwave bench.
				CO6: Describe the significance of microwave transmission lines and wave guides.
				CO1: Compare the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
				CO2: Identify different MAC mechanism (Aloha, slotted Aloha, and FDMA).
				CO3: Analyze & Building the skills of sub netting and routing.
34	IV/I	EC721PE	Computer Networks	**CO4:** Describe the different types of network devices and their functions within a network.
				CO5: Design and implement a peer to peer file sharing application utilizing application layer protocol & such as HTTP, DNS and Transportation layer protocol.
				CO6: Distinguish the ethical, legal, security and social issues related to computer networks.
35	IV/I	EC731PE	Wireless Communications And Networks	**CO1:** Understand cellular system design concepts.
				CO2: Analyze large scale path loss.
				CO3: Analyze small scale fading.
				CO4: Describe multipath propagation.
				CO5: Explain Equalization and Diversity.
				CO6: Compare different wireless networks.
36	IV/I	EC743PE	Electronic Measurements And Instrumentation	**CO1:** Analyze the various electronic instruments based on their specifications for carrying out a particular task of measurements.
				CO2: Explain the various types of signal generators, signal analyzers for generating and analyzing various real time signals.
				CO3: Define the different types of oscilloscopes and the characteristics of the signals.
				CO4: Compare different types of transducer like piezoelectric and magnetro strictive Transducers.
				CO5: Define and distinguish the types of bridges and measuring the physical parameters like Humidity, moisture, velocity and force.
				CO6: Relate the use of measuring instruments in real time applications.
37	IV/I	EC702PC	VLSI Design	**CO1:** Acquire knowledge of the Fabrication of IC using various MOS circuits and can be able to compute electrical properties of MOS circuits.
				CO2: Understand vlsi design flow and design rules for layout of IC.
				CO3: Design various gates, adders, Multipliers and Memories using stick diagrams, layouts.
				CO4: Design various forms of memories.
				CO5: Demonstrate semiconductor IC design such as PLA's, PAL, FPGA, CPLDs.
				CO6: Understand differential strategies for testing of

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				IC's and CMOS.
38	IV/I	EC705PC	Industry Oriented Mini Project	**CO1:** Analyze new problems, identify and define the appropriate requirements for their solutions.
				CO2: Understand team work to complete to reach the target.
				CO3: Learn new technologies in the engineering fields.
39	IV/I	EC706PC	Seminar	**CO1:** Express public speaking during presentations.
				CO2: Analyze new technologies in all engineering fields.
				CO3: Effectively communicate by making an oral presentation.
40	IV/II	EI744OE	Sensors and Transducers (Open Elective – III)	**CO1:** Describe various measurement standards and various errors and perform erroranalysis.
				CO2: Obtain and analyze of static and dynamic characteristics of transducer.
				CO3: Describe construction, working principle, characteristics and applications of various resistance transducers.
				CO4: State the working principle of various inductance and capacitance transducers.
				CO5: Examine the operation and applications of modern industrial transducers.
41	IV/II	EC853PE	Optical Communications (Professional Elective – V)	**CO1:** To identify the basic elements of optical fiber transmission link, fiber modes configurations and Structures.
				CO2: To analyze the different kind of losses, signal distortion, SM fibers.
				CO3: To classify the various optical sources, materials and fiber splicing.
				CO4: Illustrate the behaviour of optical transmitters & receivers for analog & digital mode of operation.
				CO5: To distinguish the fiber optical receivers and noise performance in photo detector.
				CO6: To Illustrate link budget, WDM, solutions and SONET/SDH network.
42	IV/II	EC863PE	Global Positioning System(Professional Elective – VI)	**CO1:** Identify the basic components of GPS .
				CO2: Analyze the signal characteristics and the user position calculations.
				CO3: Identify error sources in GPS observations and apply the corrections for accurate position.
				CO4: Compare the types of GPS and their architectures.
				CO5: Classify the military applications and usage of GPS
				CO6: Distinguish and understand the basic GPS signals and calculate the receiver PVT.
43	IV/II	EC801PC	Major Project	**CO1:** Analyze new problems, identify and define the appropriate requirements for its solutions.
				CO2: Understand of the impact of engineering solutions.

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				CO3: Understand team work to complete a common goal.

Program : B.Tech-Computer Science and Engineering	Academic Year : 2020-21	Semester : I & II

S.No	Year /Sem	Course Code	Course Name	Course Outcomes (After completion of the course student can able to :)
1	II/I	CS301ES	Analog and Digital Electronics	**CO1:** Acquire knowledge of electrical characteristics of ideal and practical diodes under forward and reverse bias to analyze and design diode application circuits such as rectifiers.
				CO2: Utilize operational principles of bipolar to derive appropriate small-signal models and use them for the analysis of basic circuits.
				CO3: Understand the basic concept of number systems, Boolean algebra principles.
				CO4: Understand minimization techniques for Boolean algebra.
				CO5: Analyze Combination logic circuit such as multiplexers, adders, decoders.
				CO6: Understand about synchronous and asynchronous sequential logic circuits.
2	II/I	CS302PC	Data Structures	**CO1:** Choose appropriate data structures to represent data items.
				CO2: Analyze the time and space complexities of algorithms.
				CO3: Design programs using a variety of data structures such as stacks, queues, hash tables, binary trees, search trees, heaps, graphs and B-trees.
				CO4: Analyze and implement various kinds of searching and sorting methods.
				CO5: Describe how arrays, linked structures, stacks, queues, trees, and graphs are represented in memory.
				CO6: Design programs using c language.
3	II/I		Computer Oriented Statistical Methods	**CO1:** Describe the conditional probability and state the Baye's theorem and solve its applications.
				CO2: Solve the problems on random variables and compare the difference between probability distributions.
				CO3: Construct the area of normal curve and distinguish binominal, gamma and exponential

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		MA303BS		distributions.
				CO4: Formulate the sampling distribution of means and sampling distribution of variances.
				CO5: Classify the methods of estimations and errors of estimations.
				CO6: Identify the test of hypothesis for single mean, proportion and difference between the means, proportions and learn the concept of Markov process and different types of states.
4	II/I	CS304PC	Computer Organization and Architecture	**CO1:** Describe basics of computer organization and register transfer languages and micro operations such as arithmetic, logic, shift micro operations.
				CO2: Explain about computer instructions, computer registers and instruction cycle and interrupt cycle.
				CO3: Describe the design of control unit with address sequencing and microprogramming concept and CPU with instruction formats, addressing modes and types of instructions such as data transfer, manipulation and program control.
				CO4: Describe various data representations and explain how arithmetic operations are performed by computer.
				CO5: Illustrate the concepts of Input-Output Organization and Memory Organization.
				CO6: Describe the parallel processing and multiprocessors concept.
5	II/I	CS305PC	Object Oriented Programming using C++	**CO1:** Develop application for a range of problem using object oriented programming concepts.
				CO2: Construct programs on various methodology using class and object.
				CO3: Illustrate the different forms of inheritance.
				CO4: Construct and develop programs with reusability using polymorphism and virtual function.
				CO5: Develop programs for file handling.
				CO6: Identify and can handle exceptions in programming.
6	II/I	CS306ES	Analog & Digital Electronics Lab	**CO1:** Know the characteristics of various components.
				CO2: Understand the utilization of components.
				CO3: Design and analyze small signal amplifier circuits.
				CO4: Postulates of Boolean algebra and to minimize combinational functions.
				CO5: Design and analyze combinational and sequential circuits.
				CO6: Known about the logic families and realization of logic gates.
				CO1: Summarize different categories of data Structures.
				CO2: Analyze the performance of an algorithm.
				CO3: Develop C programs for computing control statements.

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7	II/I	CS307PC	Data Structures Lab	**CO4:** Understand C programs for computing arrays, functions, pointers, strings.
				CO5: Understand stacks, queues and linked lists.
				CO6: Ability to Implement searching and sorting algorithms.
8	II/I	CS308PC	IT Workshop Lab	**CO1:** Identify the parts of CPU and able to learn knowledge for computer assembling and disassembling.
				CO2: Resolve the Software installation.
				CO3: Ability to solve the trouble shooting problems.
				CO4: Apply the techniques and netiquettes while using internet.
				CO5: Model a web page by using HTML
				CO6: Apply the tools for preparation of PPT, Documentation and budget sheet etc.
9	II/I	CS309PC	C++ Programming Lab	**CO1:** Identify and able to develop applications for a range of problems on operators such as scope resolution and new delete memory allocation.
				CO2: Write a basic concepts on initializing and displaying contents of class member and structure of class.
				CO3: Develop basic programs on inheritance.
				CO4: Identify and able to do programs to use pointer for both base and derived classes and call the member function by using Virtual keyword.
				CO5: Develop basic programs on console i/o operations.
				CO6: Develop programs on arrays and inline functions.
10	II/I	MC309	Gender Sensitization Lab	**CO1:** Develop sensibility with regard to issues of gender in contemporary India.
				CO2: Provide a critical perspective on the socialization of men and women.
				CO3: Determine information about some key biological aspects of genders.
				CO4: Debate on the politics and economics of work.
				CO5: Reflect critically on gender violence.
				CO6: Expose more egalitarian interactions between men and women.
11	II/II	CS401PC	Discrete Mathematics	**CO1:** Understand and construct precise mathematical proofs.
				CO2: Use logic and set theory to formulate precise statements.
				CO3: Analyze and solve counting problems on finite and discrete structures.
				CO4: Describe and manipulate sequences.
				CO5: Apply graph theory in solving computing problems.
				CO1: The students will understand various forms of Business and the impact of economic variables on the business.

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12	II/II	SM402MS	Business Economics & Financial Analysis	**CO2:** Understand the significance of elasticity of demand and its forecasting, law of demand and its exceptions and supply analysis.
				CO3: Understand production analysis function with different variables and cost analysis functions.
				CO4: To adopt the principles of accounting to record, classify and summarize various transactions in books of accounts for preparation of final accounts.
				CO5: Understand the Ratio analysis to give an idea about financial forecasting, financial planning, controlling and decision making.
				CO6: Understand the implementation of different structures of markets covering how price-output is determined under different market structures.
13	II/II	CS403PC	Operating Systems	**CO1:** Describe operating system goals and functions.
				CO2: Get the knowledge of process, various CPU scheduling algorithms and synchronization.
				CO3: Analyze the methods for handling deadlocks.
				CO4: Understand the memory management and several page replacement algorithms.
				CO5: Classify the storage management and file system implementation.
				CO6: Express the various system protection methods.
14	II/II	CS404PC	Database Management Systems	**CO1:** Identify and understand the underlying concepts of database techniques and query a database using DML/DDL commands and able to design entity relationship diagrams.
				CO2: Explain the concepts of relational data model, entity-relationship model and relational database design.
				CO3: Apply relational algebra and calculus, understands the use of sql and learns sql syntax.
				CO4: Develop and improve database design by normalization.
				CO5: Define transaction and understand its properties. Learns techniques for controlling the consequences of concurrent data access.
				CO6: Describe basic database storage structures and access techniques: file and page organisations, index methods including B tree and Hashing.
15	II/II	CS405PC	Java Programming	**CO1:** Analyze Object Oriented Programming Concepts.
				CO2: Develop the Abstract Classes and know the importance of the Inheritance, Encapsulation and Polymorphism.
				CO3: Implementing interfaces and creating packages and create files and directories using g Java I/O Streams.
				CO4: Get the importance of Exception handling and knowledge of multithreading and java collection classes concepts.
				CO5: Design web applications by using applets and swings.
				CO6: Recognize event handling concepts in java.

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16	II/II	CS406PC	Operating Systems Lab	**CO1:** Develop programs on CPU scheduling algorithms.
				CO2: Construct the programs on file organisation and file allocation techniques.
				CO3: Solve deadlock avoidance and deadlock prevention using Bankers' algorithm.
				CO4: Classify and construct programs on memory management techniques.
				CO5: Develop application programs using system calls.
				CO6: Describe inter processes communication between the processes using semaphores and named pipes.
17	II/II	CS406PC	Database Management Systems Lab	**CO1:** Identify and understand the underlying relational data model, entity-relationship model and relational database design.
				CO2: Develop and improve database design by normalization.
				CO3: Identify and understand the underlying concepts of database techniques and query a database using DML/DDL commands.
				CO4: Identify and understands the use of sql and learns sql syntax of set difference operators and joins.
				CO5: Write basic database query using Aggregate operators.
				CO6: Write basic database on Triggers and procedures.
18	II/II	CS408PC	Java Programming Lab	**CO1:** Construct the programs for Abstract classes, Inheritance and Interface.
				CO2: Write the program for Multithreading and Files operations.
				CO3: Prepare the programs for applets.
				CO4: Develop the basic applications by using Swing components.
				CO5: Construct the programs for collection Framework.
				CO6: Recognize the concept of Event Listeners and implements the Event components.
19	II/II	MC409	Constitution of India	**CO1:** Understand meaning, features, characteristics of constitution law and constitutionalism.
				CO2: Describe fundamental rights, fundamental duties and its legal status.
				CO3: Describe The constitution powers and status of the President of India.
				CO4: Understand Emergency Provisions: National Emergency, President Rule, And Financial Emergency.
				CO5: Understand Fundamental Right to Equality, Fundamental Right to certain Freedom under Article 19.
				CO6: Describe the Scope of the Right to Life and Personal Liberty under Article 21.
20	III/I			**CO1:** Understand the basic properties of formal languages and grammars.

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		CS501PC	Formal Languages & Automata Theory	**CO2:** Differentiate regular, context-free and recursively enumerable languages.
				CO3: Make grammars to produce strings from a specific language.
				CO4: Acquire concepts relating to the theory of computation and computational models including decidability and intractability.
21	III/I	CS502PC	Software Engineering	**CO1:** Analyze various data base techniques for data warehouse and able to perform OLAP Operations.
				CO2: Ability to perform the Pre-processing of data and apply mining techniques on data.
				CO3: Understand frequent set and apply association Rule on Data Set.
				CO4: Evaluate the data mining ask like Classification, Regression Clustering on large data set.
				CO5: Ability to solve real world Problems in business and scientific information using data mining.
				CO6: Ability to understand clustering Concepts in the real world and apply Various clustering techniques.
22	III/I	CS503PC	Computer Networks	**CO1:** Gain the knowledge of the basic computer network technology.
				CO2: Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
				CO3: Obtain the skills of subnetting and routing mechanisms**.**
				CO4: Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.
				CO5: Analyze Application Layer.
				CO6: Analyze transport Layer.
23	III/I	CS504PC	Web Technologies	**CO1:** Construct the web applications using HTML language.
				CO2: Explain server side scripting with PHP language.
				CO3: Identify well formed/valid XML documents.
				CO4: Develop server side applications using servlets.
				CO5: Get the knowledge on Java Server Pages.
				CO6: Evaluate the validation of forms using Java Script and Explain AJAX.
24	III/I	CS515PE	Principles of Programming Languages	**CO1:** Explain the basics of PPL.
				CO2: Analyze different types of data types in PPL.
				CO3: Familiarity with subprograms and blocks.
				CO4: Explain about abstract data types.
				CO5: Understand the process of concurrency.
				CO6: Differentiate Functional Programming languages, Logical Programming language and scripting language.
25	III/I	Computer Graphics	CS521PE	**CO1:** Understand output primitives , polygon filling.
				CO2: Explain about 2-D geometrical transforms and 2-D viewing.
				CO3: Analyze 3-D object representation.
				CO4: Understand basic Illumination methods.

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				CO5: Explain about 3-D geometrical transforms and 3-D viewing.
				CO6: Design computer animations.
26	III/I	CS505PC	Software Engineering Lab	**CO1:** Understand the software engineering methodologies involved in the phases for project development.
				CO2: Gain knowledge about open source tools used for implementing software engineering methods.
				CO3: Exercise developing product-start-ups implementing software engineering methods.
				CO4: Study the problem and identify the project scope, Objectives and Infrastructure.
				CO5: Identify the modules of the project and differentiate the functional and non-functional requirements.
				CO6: Create prototypes for the projects.
27	III/I	CS506PC	Computer Networks & Web Technologies Lab	**CO1:** Implement data link layer farming methods.
				CO2: Analyze error detection and error correction codes.
				CO3: Implement and analyze routing and congestion issues in network design.
				CO4: Implement Encoding and Decoding techniques used in presentation layer.
				CO5: To be able to work with different network tools.
28	III/I	EN508HS	Advanced Communication Skills Lab	**CO1:** Speak effectively.
				CO2: Express and communicate fluently and appropriately in social professional contexts.
				CO3: Develop the comprehensive ability through English language enables the students in understanding and assimilating other engineering subjects.
				CO4: The awareness of English lab enriches their communication and soft skills contributing to their overall development and success.
				CO5: Draft various letters and reports for all official purpose.
				CO6: Take part in social and professional communication.
29	III/I	MC510	Intellectual Property Rights	**CO1:** Analyze different types of intellectual property.
				CO2: Express function of trademarks.
				CO3: Understand law of copy rights.
				CO4: Understand law of patents.
				CO5: Explain trade secrets.
				CO6: Understand the development of intellectual property.
30	III/II		Machine Learning	**CO1:** Understand perspectives and issues in machine learning and decision tree learning.
				CO2: Understand artificial neural network problem and evaluation hypotheses.
				CO3: Explain Baysean learning.

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		CS601PC		**CO4:** Differentiate computational learning and instance based learning.
				CO5: Describe Genetic algorithms.
				CO6: Analyze different analytical learning approaches.
31	III/II	CS602PC	Compiler Design	**CO1:** Describe structure of a compiler and basics of programming languages.
				CO2: Design Lexical analyzer generator by using regular expressions and finite automata.
				CO3: Design and implement LL and LR parsers and use YACC Tool for developing a parser.
				CO4: Explain the applications of SDT and different types of intermediate-code generation.
				CO5: Identify the storage organization used to support the run-time environment of a program and effectively generate machine codes.
				CO6: Apply the several algorithms for collecting and optimizing the information using data flow analysis.
32	III/II	CS603PC	Design and Analysis of Algorithms	**CO1:** Analyze the Performance of an Algorithm.
				CO2: Solve the problems using divide and conquer approach.
				CO3: Develop constraint satisfied solutions using backtracking.
				CO4: Evaluate feasible solutions using Greedy method.
				CO5: Developing solutions to problems using dynamic programming.
				CO6: Define np hard and no complete problems.
33	III/II	CS613PE	Scripting Languages	**CO1:** Describe execution of Ruby programs, packages in Ruby.
				CO2: Explain about Ruby objects , Memory allocation , Embedding Ruby.
				CO3: Understand Perl basics , scripting language basics.
				CO4: Analyze Perl Names and values , control structures and arrays.
				CO5: Explain the advancements in Perl.
				CO6: Describe TCL structure, data structures.
34	III/II	CS604PC	Machine Learning Lab	**CO1:** Understand complexity of Machine Learning algorithms and their limitations.
				CO2: Understand modern notions in data analysis-oriented computing.
				CO3: Applying common Machine Learning algorithms in practice and implementing their own.
				CO4: Perform experiments in Machine Learning using real-world data.
	III/II		Compiler Design Lab	**CO1:** Develop client-server application using web technologies.
				CO2: Introduce server-side programming with Java servlets and JSP.
				CO3: Understand the various phases in the design of a

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35		CS605PC		compiler.
				CO4: Understand the design of top-down and bottom-up parsers.
				CO5: Understand syntax directed translation schemes.
				CO6: Introduce lex and yacc tools.
36	III/II	CS623PE	Scripting Languages Lab	**CO1:** Understand the differences between Scripting languages and programming languages.
				CO2: Gain fluency in Ruby.
				CO3: Gain fluency in Perl.
				CO4: Gain fluency in TCL.
37	IV/I	CS701PC	Data Mining	**CO1:** Analyze various data base techniques for data warehouse and able to perform OLAP Operations.
				CO2: Ability to perform the Pre-processing of data and apply mining techniques on data.
				CO3: Understand frequent set and apply association Rule on Data Set.
				CO4: Evaluate the data mining ask like Classification, Regression Clustering on large data set.
				CO5: Ability to solve real world Problems in business and scientific information using data mining.
				CO6: Ability to understand clustering Concepts in the real world and apply Various clustering techniques.
38	IV/I	CS702PC	Principles of Programming Languages	**CO1:** Express the important features of the Programming Languages.
				CO2: Develop the skills for expressing syntax and semantics in formal notation.
				CO3: Compare different Programming Domains.
				CO4: Choose Specific Programming Language for the Development of Specific Applications.
				CO5: Analyze the Importance of Implementation Process.
				CO6: Apply a suitable programming paradigm for a given computing application.
39	IV/I	CS721PE	Python Programming	**CO1:** Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
				CO2: Demonstrate proficiency in handling Strings and File Systems.
				CO3: Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
				CO4: Interpret the concepts of Object-Oriented Programming as used in Python.
				CO5: Implement exemplary applications related to Network Programming, Web Services and Databases in Python.
40	IV/I		Machine Learning	**CO1:** Understand perspectives and issues in machine learning and decision tree learning.
				CO2: Understand artificial neural network problem and evaluation hypotheses.

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		CS733PE		**CO3:** Explain Baysean learning.
				CO4: Differentiate computational learning and instance based learning.
				CO5: Describe Genetic algorithms.
				CO6: Analyze different analytical learning approaches.
41	IV/I	CS742PE	Cloud Computing	**CO1:** Understand various service delivery models of a cloud computing architecture.
				CO2: understand the ways in which the cloud can be programmed and deployed.
				CO3: Understand cloud service providers.
				CO4: Describe cloud computing architecture and management.
				CO5: Describe cloud computing fundamentals.
42	IV/I	CS703PC	Data Mining Lab	**CO1:** Add mining algorithms as a component to the exiting tools.
				CO2: Apply mining techniques for realistic data.
				CO3: Perform the Pre-processing of data and apply mining techniques on data.
				CO4: Understand frequent set and apply association Rule on Data Set.
				CO5: Evaluate the data mining ask like Classification, Regression Clustering on large data set.
				CO6: Solve real world Problems in business and scientific information using data mining.
43	IV/I	CS705PC	Industry Oriented Mini Project	**CO1:** Apply fundamental concepts and methods of their engineering field.
				CO2: Use effectively oral, written and visual communication.
				CO3: Understand working with teams.
44	IV/I	CS706PC	Seminar	**CO1:** Understand advanced research methodologies in the field of computer science engineering.
				CO2: Demonstrate their understanding of discussions and spark further discussion.
				CO3: Identify understand and discuss current issues in the engineering field.
45	IV/II	CS712PE	Scripting Languages	**CO1:** Describe execution of Ruby programs, packages in Ruby.
				CO2: Explain about Ruby objects , Memory allocation , Embedding Ruby.
				CO3: Understand Perl basics , scripting language basics.
				CO4: Analyze Perl Names and values , control structures and arrays.
				CO5: Explain the advancements in Perl.
				CO6: Describe TCL structure, data structures.
	IV/II		Design and Analysis of Algorithms	**CO1:** Analyze the Performance of an Algorithm.
				CO2: Solve the problems using divide and conquer approach.
				CO3: Develop constraint satisfied solutions using

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46		CS715PE		backtracking.
				CO4: Evaluate feasible solutions using Greedy method.
				CO5: Developing solutions to problems using dynamic programming.
				CO6: Define np hard and no complete problems.
47	IV/II	CS801PC	Major Project	**CO1:** Analyze engineering problems, identify an appropriate solution, implement the methodology and propose a meaningful solution.
				CO2: Develop confidence for self-education and ability for lifelong learning**.**
				CO3: Learn to work as a team and to focus on getting a working project done within a stipulated period of time.

Program : B.Tech-Civil Engineering	Academic Year : 2020-21	Semester : I & II

S.No	Year /Sem	Course Code	Course Name	Course Outcomes (After completion of the course student can able to :)
1	II/I	CE301PC	Surveying and Geomatics	**CO1:** Define the principles of surveying and its phases and measure the directions by using chain and prismatic compass.
				CO2: Analyzing the levels of ground and computing the area and volumes.
				CO3: Explain the theodalite surveying and analyse the methods of traversing.
				CO4: Explain the principles of tachometry surveying and differentiate types of curves.
				CO5: Explain the total station and global positioning system.
				CO6: Define contouring and study its characteristics and its uses.
2	II/I	CE302PC	Engineering Geology	**CO1:** Write about importance of geology from civil engineering point of view.
				CO2: Distinguish weathered rocks from fresh rocks.
				CO3: Identify geological structures and processes for rock mass quality.
				CO4: Identify subsurface information and groundwater potential sites through geophysical Investigations.
				CO5: Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels.
				CO6: Develop understanding on impact of geological features on civil engineering projects.

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3	II/I	CE303PC	Strength of Materials – I	**CO1:** Describe the basic concept of stress and strain.
				CO2: Draw SFD and BMD for different beams subjected to different loads.
				CO3: Formulate flexural stresses, shear stresses and its distribution for various sections.
				CO4: Assess slope and deflection of beams subjected to loads.
				CO5: Apply the principal stresses and strains in structural members.
				CO6: Analyze of the principles and basics of strength of materials in the civil engineering structures.
4	II/I	MA304BS	Probability and Statistics	**CO1:** Describe the use of Baye's theorem techniques when solving the problems.
				CO2: Discuss the properties of Discrete and continuous probability distributions.
				CO3: Solve the problems on Binomial and Geometric distributions and also normal distribution.
				CO4: Determine the testing of Hypothesis by using Type- I and Type- II errors.
				CO5: Identify the different types of hypothesis.
				CO6: Create the new problems on correlations and Regressions.
5	II/I	CE305PC	Fluid Mechanics	**CO1:** Explain the properties of the fluids.
				CO2: Describe and classification of the flows.
				CO3: Identify the discharge through the various discharge meters.
				CO4: Explain the How to move the fluid various flows and finding the discharge.
				CO5: Differentiate the fluid flow in layer by layer.
6	II/I	CE306PC	Surveying Lab	**CO1:** Prepare the surveying of an area by chain, and compass survey (closed traverse) & plotting.
				CO2: Solve and Calculation of areas, Drawing plans and contour maps using different measuring equipment at field level.
				CO3: Recognize Trigonometric leveling using theodalite.
				CO4: Apply the principle of surveying for civil Engineering Applications.
				CO5: Draw determination of height, remote elevation, and distance between inaccessible points using total station.
7	II/I	CE307PC	Strength of Materials Lab	**CO1:** Identify modulus of rigidity using spring test.
				CO2: Examine the properties of steel under different loads like tension, compression etc.
				CO3: Distinguish between simply supported beams and cantilever beams under shear stresses.
				CO4: Assess the deflection of beams under given loads.

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				CO5: 5 Investigate the hardness of materials like stainless steel, aluminium, brass etc.
				CO6: Judge the resistance of mild steel under impact loads.
8	II/I	CE308PC	Engineering Geology Lab	**CO1:** Study of physical properties and identification of minerals referred under theory.
				CO2: Mega scopic and microscopic identification of minerals.
				CO3: Interpretation and drawing of sections for geological maps showing titled beds, faults, Uniformities, etc.
				CO4: Solve simple structural geology problems.
9	II/I	MC309	Constitution of India	**CO1:** Understand meaning, features, characteristics of constitution law and constitutionalism.
				CO2: Describe fundamental rights, fundamental duties and its legal status.
				CO3: Describe The constitution powers and status of the President of India.
				CO4: Understand Emergency Provisions: National Emergency, President Rule, And Financial Emergency.
				CO5: Understand Fundamental Right to Equality, Fundamental Right to certain Freedom under Article 19.
				CO6: Describe the Scope of the Right to Life and Personal Liberty under Article 21.
10	II/II	EE401ES	Basic Electrical and Electronics Engineering	**CO1:** Understand the basic electrical circuit elements and different ac circuits.
				CO2: Understand the installation of different electrical equipments.
				CO3: Describe the working of different transformers.
				CO4: Understand the principles of DC motors.
				CO5: Analyze the different diodes, rectifiers and filters.
				CO6: Understand the principle, applications of BJT and FET.
11	II/II	CE402ES	Basic Mechanical Engineering for Civil Engineers	**CO1:** Understand the Mechanical equipment for the usage cams, riveted joint and discuss the materials.
				CO2: Analyze the working of power transmission elements like gears, belt drive, chain drive & material handling equipment.
				CO3: Illustrate the working features of IC engines, the basic principles of refrigeration and laws of heat transfer.
				CO4: Describe different types of welding process for joining & classify the process of casting.
				CO5: Differentiate understand working of lathe, drilling, milling & grinding machines.
12	II/II		Building Materials, Construction	**CO1:** Identification of suitable construction materials building stones properties and bricks wood structures.
				CO2: Apply the manufacture type of cements, cement hydration properties and field test and uses of admixtures minerals.

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		CE403PC	and Planning	**CO3:** Identify the components of building and differentiate various types of building materials depending on its function.
				CO4: Prepare of various construction related activities like stone masonry, plastering, painting, Form work.
				CO5: Classify the principles of building planning and building by laws.
				CO6: Illustrate the various precautionary measures pertaining to construction materials.
13	II/II	CE404PC	Strength of Materials - II	**CO1:** Illustrate the various precautionary measures pertaining to construction materials.
				CO2: Asses to understand the behaviour of columns and struts under axial loading.
				CO3: Evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading.
				CO4: Analyze strength and stability of structural members subjected to Direct, and Direct and Bending stresses.
				CO5: Understand and evaluate the shear center and unsymmetrical bending.
				CO6: Appraise strengths of different materials.
14	II/II	CE405PC	Hydraulics and Hydraulic Machinery	**CO1:** Explain the properties of the fluids.
				CO2: Describe and classification of the flows.
				CO3: Identify the discharge through the various discharge meters.
				CO4: Explain the How to move the fluid various flows and finding the discharge.
				CO5: Differentiate the fluid flow in layer by layer.
				CO6: Discuss the classification of fluid and its properties find out the discharge & amp various conditions flows in fluids.
15	II/II	CE406PC	Structural Analysis - I	**CO1:** Analyze perfect, imperfect and redundant frames.
				CO2: Compare different frames.
				CO3: Apply classical methods for one dimensional and two dimensional problems.
				CO4: Analyze indeterminate structures.
				CO5: Apply slope-deflection and moment distribution method for continuous beams with and without settlement of supports.
				CO6: Analyze structures for gravity loads, moving loads and lateral loads.
16	II/II		Computer Aided Civil Engineering Drawing	**CO1:** Summarize the AutoCAD commands for drawing 2D & 3D building drawings required for different civil engineering applications.
				CO2: Plan and draw Civil Engineering Buildings as per aspect and orientation.
				CO3: Categorize drawings as per user requirements and

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		CE407PC		preparation of technical report.
				CO4: Draw a plan of a Building and with dimensioning the plan.
				CO5: Define the tools like Draw tools, Modify tools which are used in AutoCAD.
				CO6: Develop sections and elevations for given Single storied buildings, multi storied buildings.
17	II/II	CE409PC	Hydraulics And Hydraulic Machinery Lab	**CO1:** Understand the properties of the fluids.
				CO2: Describe and classification of the flows.
				CO3: Identify the discharge through the various discharge meters.
				CO4: Understand the How to move the fluid various flows and finding the discharge.
				CO5: Differentiate the fluid flow in layer by layer.
18	II/II	EE409ES	Basic Electrical & Electronics Engineering Lab	**CO1:** Understand behavior of different electrical components.
				CO2: Formulate and solve AC,DC circuits.
				CO3: Realize the requirement of transformers.
				CO4: Explain the properties of electromagnetic circuit.
				CO5: Understand the principles of various electrical circuits.
				CO6: Understand working principles of various analogue electrical measuring instruments.
19	II/II	MC409	Gender Sensitization Lab	**CO1:** Develop sensibility with regard to issues of gender in contemporary India.
				CO2: Provide a critical perspective on the socialization of men and women.
				CO3: Determine information about some key biological aspects of genders.
				CO4: Debate on the politics and economics of work.
				CO5: Reflect critically on gender violence.
				CO6: Expose more egalitarian interactions between men and women.
20	III/I	CE501	Structural Analysis – II	**CO1:** Analyze the two hinged arches.
				CO2: Solve statically indeterminate beams and portal frames using classical methods
				CO3: Draw the shear force and bending moment diagrams for indeterminate structures
				CO4: Formulate the stiffness matrix and analyze the beams by matrix methods.
				CO5: Solve the approximate and numerical methods of analysis for indeterminate structures
				CO6: Design the variation of S.F and B.M when a moving load passes on indeterminate structure.
21	III/I		Geotechnical Engineering	**CO1:** Distinguish the properties and classification of the Soils.
				CO2: Describe the Factors affecting permeability of the Soils
				CO3: Develop the Stress Distribution of the compaction

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		CE502PC		effects on soil properties
				CO4: Develop the Stress Distribution of the Consolidation effects on soil properties.
				CO5: Classify the Shear Strength Of Soils Importance of parameters
				CO6: Describe the classification of soil and its properties find out the permeability various conditions flows in soil.
22	III/I	CE503PC	Structural Engineering-I (RCC)	**CO1:** Analyze of the Reinforced concrete beams using limit state design
				CO2: Design the Reinforced concrete structural slabs
				CO3: Design the Reinforced concrete structural elements
				CO4: Design the different types footings
				CO5: Design of the staircases
				CO6: Explain about the structures for serviceability
23	III/I	CE504PC	Transportation Engineering	**CO1:** Highway Development in India.
				CO2: Importance of Geometric Design.
				CO3: Introduction to traffic and Design of Traffic Signals.
				CO4: Explain the Intersection Design and Types of Intersections.
				CO5: Explain the Design of Pavements.
				CO6: Explain the highway engineering and design of pavements and to analysis the traffic signals.
24	III/I	CE602PE	Concrete Technology (Professional Elective-I)	**CO1.** Define the properties of concrete material
				CO2: Describe the behaviour of concrete properties of fresh concrete
				CO3: Describe the behaviour of concrete properties of hardened concrete
				CO4: Recognize the Workability of freshly mix concrete
				CO5: Apprise the difference between Self Compacting Concrete and normal
				CO6: Examine the Non Destructive test's on concrete.
25	III/I	SM505MS	Engineering Economics and Accountancy	CO.1 The students will understand the concepts of economics, demand, supply and various methodology of economics and the methods and theories.
				CO.2 Understand the various macroeconomic concepts like national income, methods of estimation, inflation, deflation and new economic policy.
				CO.3 Understand the significance of capital budgeting, time value of money, methods of appraisal techniques, payback period, average rate of return, profitability index.
				CO.4 Understands the concepts of equity and debt financing, leverages and types of leverages.
				CO.5 To adopt the principles of accounting to record, classify and summarize various transactions in books of accounts for preparation of final accounts.
				CO.6 Understand the concept of cost and break-even analysis, application and limitations.
			Highway	**CO.1** Define the properties of concrete material.

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26	III/I	CE506PC	Engineering and Concrete Technology Lab	**CO.2** Describe the behaviour of concrete & properties of fresh concrete.
				CO.3 Describe the behaviour of concrete & properties of hardened concrete
				CO.4 Recognize the Workability of freshly mix concrete
				CO.5 Apprise the difference between Self Compacting Concrete and normal
				CO.6 Examine the Non Destructive test's on concrete
27	III/I	CE507PC	Geotechnical Engineering Lab	**CO.1** calculate and analyze the stresses on soil and be able to draw the stress paths
				CO.2 evaluate the compressibility of soils
				CO.3 suggest suitable ground improvement techniques for expansive soils
				CO.4 execute various field tests and sampling techniques
				CO.5 obtain and analyze the shear strength of soils
28	III/I	EN508HS	Advanced Communication Skills Lab	**CO1:** Speak effectively.
				CO2: Express and communicate fluently and appropriately in social professional contexts.
				CO3: Develop the comprehensive ability through English language enables the students in understanding and assimilating other engineering subjects.
				CO4: The awareness of English lab enriches their communication and soft skills contributing to their overall development and success.
				CO5: Draft various letters and reports for all official purpose.
				CO6: Take part in social and professional communication.
29	III/I	MC509	Intellectual Property Rights	**CO1:** Analyze different types of intellectual property.
				CO2: Express function of trademarks.
				CO3: Understand law of copy rights.
				CO4: Understand law of patents.
				CO5: Explain trade secrets.
				CO6: Understand the development of intellectual property.
30	III/II	CE601PC	Hydrology & Water Resources Engineering	**CO.1** Know types of water retaining structures for multiple purposes and its key parameters considered for planning and designing
				CO.2 Understand details in any Irrigation System and its requirements
				CO.3 Know types of a irrigation system components
				CO.4 Analyze of a irrigation system
				CO.5 Design of a irrigation system components
				CO.6 Design principles of Notch Fall and Sarada type Fall.
31	III/II		Environmental Engineering	**CO.1** Assess characteristics of water and wastewater and their impacts
				CO.2 Estimate quantities of water and waste water and plan conveyance components

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		CE602PC		**CO.3** Design components of water and waste water treatment plants
				CO.4 Examine conversant with issues of air pollution and control
				CO.5 Explain about classification of air pollution
				CO.6 Discuss Meteorological parameters affecting air pollution
32	III/II	CE603PC	Foundation Engineering	**CO1:** Identify a suitable foundation system for a structure.
				CO2: Evaluate the importance of raft foundation and principles of design for buildings and tower structures.
				CO3: Analyze and design pile foundations.
				CO4: Examine and discuss various machine foundations.
				CO5: Analyze and design Sheet piles and cofferdams.
33	III/II	CE604PC	Structural Engineering-II(Steel)	**CO1:** Analyze of the built up members and Column base
				CO2: Analyze of the plate girders and Roof Trusses
				CO3: Define the beams and beam columns
				CO4: Design the tension and compression members
				CO5: Design of the bolt and weld connections
				CO6: Explain about the Plastic beams
34	III/II	CE612PE	Prestressed Concrete (Professional Elective-II)	**CO1** Explain different types of Pre-stressing materials and methods of pre-stressing
				CO2 Write about different losses of pre-stres
				CO3 Flexure & Shear analysis of pre-stressed concrete
				CO4 Examining the Transmission of pre-stressing force
				CO5 Analysis of composite beams & Deflection concept
35	III/II	MS611OE	Fundamentals of Management for Engineers (Open Elective-I)	**CO1:** Identify the areas to control and Selecting the Appropriate controlling methods/Techniques
				CO2: Develop the process of management's four functions: planning, organizing, leading, and controlling.
				CO3: Analyze and evaluate the influence of historical forces on the current practice of management
				CO4: Examine the circumstances that lead to management evolution and how it will affect future managers
				CO5: Evaluate leadership styles to anticipate the consequences of each leadership style.
36	III/II	CE605PC	Environmental Engineering Lab	**CO1:** Define physical, chemical, biological characteristics of water and wastewater.
				CO2: Examinee break-point chlorination.
				CO3: Assess optimum dosage of coagulant.
				CO4: Assess the quality of water and wastewater.
				CO5: Examine the use of Nephlo turbidity meter.
				CO6: Analyze the difference of Total Solids, Total Dissolved Solids and Settle able solids.
37	III/II		Computer Aided Design Lab	**CO1:** Model the geometry of real-world structure Represent the physical model of structural element/structure.

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		CE606PC		**CO2:** Analysis design of space frames subjected to DL & LL.
				CO3: Interpret from the Post processing results.
				CO4: Design the structural elements and a system as per IS Codes.
				CO5: Design the structural elements like RCC beam and RCC slab.
				CO6: Detailing of Steel built up compression member.
38	III/II	MC609	Environmental Science	**CO1:** Get the information about ecosystem and also about its functions like Food chain, Ecological pyramids etc.,
				CO2: Get the knowledge about the different types of resources like land, water, mineral and energy and also about the effects of environment by the usage of these resources.
				CO3: Gain the knowledge about the ecosystem diversity, its values and also about the importance of the endemic species and different techniques involved in its conservation
				CO4: Gain the knowledge about the different types of pollutions and their control technologies, Waste water treatment, Bio medical waste management etc.,
				CO5: Get the complete information about EIA- Environmental Impact Assessment,
				CO6: Gain the knowledge about environmental policies and regulations.
39	IV/I	CE701PC	Transportation Engineering	**CO1:** Highway Development in India.
				CO2: Importance of Geometric Design.
				CO3: Introduction to traffic and Design of Traffic Signals.
				CO4: Explain the Intersection Design and Types of Intersections.
				CO5: Explain the Design of Pavements.
				CO6: Explain the highway engineering and design of pavements and to analysis the traffic signals.
40	IV/I	CE702PC	Estimation Quantity Surveying and Valuation	**CO1:** Assess of quantities for a Residential Building & Abstract cost Estimate.
				CO2: Design and Prepare Bar bending schedule for reinforcement works.
				CO3: Estimate the calculation of earth work quantity for roads and canals.
				CO4: Analyze the rates of work quantities and labour.
				CO5: Compare different types of contracts, tender document for building & valuation.
				CO6: To provide the student with the ability to and preparation of reports for estimation of various items.
41	IV/I	CE702PC	Construction Technology and Management (Professional Elective-II)	**CO1:** Understand the roles and responsibilities of a project manager.
				CO2: Prepare schedule of activities in a construction project.
				CO3: Identify the equipment used in construction.
				CO4 : Understand safety practices in construction industry
				CO5: Prepare tender and contract document for a

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				construction project.
42	IV/I	CE702PE	Ground Improvement Techniques (Professional Elective-III)	**CO1:** Identify the type of problems in problematic soils and solve their problems using different ground improvement techniques.
				CO2: Design of reinforced earth retaining structures.
				CO3: Design drainage and dewatering systems for various civil engineering problems.
				CO4: Apply knowledge on ground improvement techniques such as reinforced earth, drainage and dewatering and grouting techniques on stabilization of expansive soils.
				CO5: Understand the need of ground improvement for stable engineered structures using various techniques.
				CO6: Understand the ground improvement techniques such as ground anchors, rock bolting and soil nailing.
43	IV/I	CE708PE	Traffic Engineering (Professional Elective-IV)	**CO1:** Apply the knowledge of mathematics, science and engineering in the areas of traffic engineering
				CO2: Assess the issues related to road traffic and provide engineering solutions
				CO3: understanding of road user psychological and behavioral patterns
				CO4: Design Intersections and prepare traffic management plans.
				CO5: evaluate the structural and functional conditions of in-service highway pavements
				CO6: Determine capacity and LOS
44	IV/I	CE703PC	Transportation Engineering Lab	**CO1:** Identifying the aggregate strength.
				CO2: Analyze aggregate size and shape.
				CO3: Identifying the bituminous strength.
				CO4: Determine the bituminous elongation point.
				CO5: Determine traffic volume studies.
				CO6: Analyze the aggregate strengths and bituminous strengths.
45	IV/I	CE704PC	Environmental Engineering Lab	**CO1:** Define physical, chemical, biological characteristics of water and wastewater.
				CO2: Examinee break-point chlorination.
				CO3: Assess optimum dosage of coagulant.
46	IV/I	CE705PC	Industry Oriented Mini Project	**CO1:** Assess the quality of water and wastewater.
				CO2: Examine the use of Nephloturbidity meter.
				CO3: Analyze the difference of Total Solids, Total Dissolved Solids and Settle able solids.
47	IV/I	CE705PC	Seminar	**CO1:** Adapt a factual approach to decision making
				CO2: Effectively communicate by making an oral presentation before an evaluation committee.
				CO3: Analyze new technologies in all engineering fields.
48	IV/II	MS701OE	Total Quality Management (Open Elective-III)	**CO1:** To realize the importance of significance of quality.
				CO2: Manage quality improvement teams.
				CO3: Identify requirements of quality improvement programs.
				CO4: Apply the concepts of HRM in Recruitment,

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				Selection, Training & Development.
				CO5: Develop PERT/CPM Charts for projects of an enterprise and estimate time & cost of project.
49	IV/II	CE852PE	Payment Design (Professional Elective-V)	**CO1:** Characterize the response characteristics of soil, aggregate, asphalt, and asphalt mixes.
				CO2: Analyze flexible pavements.
				CO3: Analyze rigid pavements.
				CO4: Design a flexible pavement using IRC, Asphalt Institute, and AASHTO methods.
				CO5: Design a rigid pavement using IRC .
				CO6: Design a rigid pavement using AASHTO methods.
50	IV/II	CE864PE	Industrial Waste Water Treatment (Professional Elective-VI)	**CO1:** Identify the characteristics of industrial wastewaters.
				CO2: Describe pollution effects of disposal of industrial effluent.
				CO3: Identify and design treatment options for industrial wastewater.
				CO4: Formulate environmental management plan.
				CO5: Design of Digester Tank.
				CO6: Design of Oxidation Ponds, Lagoons.
51	IV/II	CE801PC	Major Project	**CO1:** Learn to work as a team and to focus on getting a working project done within a stipulated period of time.
				CO2: demonstrate the understanding of impact of engineering solutions on the society.
				CO3: Plan, analyze, design and implement using different tools.

Program : B.Tech- Mechanical Engineering	**Academic Year :** 2020-21	**Semester :** I & II

S.No	Year/ Sem	Course Code	Course Name	Course Outcomes (After completion of the course student can able to :)
1	II/I	MA301BS	Probability and Statistics & Complex Variables	**CO1:** Describe the use of Baye's theorem techniques when solving the problems.
				CO2: Solve the problems on Binomial and Geometric Distributions.
				CO3: Determine the testing of Hypothesis by using Type-I and Type-II errors.
				CO4: Identify the Different types of Hypothesis.
				CO5: Describe the complex function with their analyticity, integration using Cauchy's Integral and Residue theorem.
				CO6: Discuss the Taylor's and Laurent series expansions.
				CO1: Define the fundamental of stress and strain and

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2	II/I	ME302PC	Mechanics of Solids	the relationship between both equations in order to solve problems for simple tri-dimensional elastic solids & thermal stress, strain energy.
				CO2: Differentiate the different type of beams & loads and also calculate the sheer force and bending moments diagram and their relations.
				CO3: Explain the Flexural Stresses, Assumptions & equations and also Shear stress distribution across various beams sections.
				CO4: Analyze Principal Stresses and Strains problem identification, formulation and solution using a range of analytical methods and also calculate the Various theories of failure.
				CO5: Apply the loads Torsion of Circular Shafts and also calculate Theory of pure torsion, Assumptions & Thin Cylinders Derivation of formula for stress & strain.
3	II/I	ME303PC	Material Science and Metallurgy	**CO1**: Analyze the Structure of materials at different levels, basic concepts of crystalline materials like unit cell, FCC, BCC, HCP, APF (Atomic Packing Factor), Co-ordination Number etc.
				CO2: Identify concept of mechanical behaviours, strength & properties of different metallic materials.
				CO3: Differentiate different phase& phase diagram & understand the basic terminologies associated with metallurgy. Construction and identification of phase diagrams and reactions.
				CO4: Identify and suggest the heat treatment process & types. Significance of properties Vs microstructure . Surface hardening & its types. Introduce the concept of harden ability & demonstrate the test used to find harden ability of steels.
				CO5: Summarize the different classification & application of advanced materials like ceramics, polymers & composites.
				CO6: Study the different classification & application of advanced materials like composites, polymers & ceramics.
4	II/I	ME304PC	Production Technology	**CO1:** Formulate the process of casting and different allowances occurred during the casting and also different material selection for the patterns.
				CO2: Design core, core print and Gating System in metal Casting System.
				CO3: Describe different types of welding process for joining of similar and dis-similar metals.
				CO4: Analyze the welding defects by different processes.
				CO5: Classify the different types of joining process like Hot working, cold working Blanking and piercing – Bending and forming wire drawing and Tube drawing.
				CO6: Apply the different types Extrusion process &

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				Forging process.
5	II/I	ME305PC	Thermo Dynamics	**CO1:** Differentiate between different thermodynamic systems and processes and compare Macroscopic and Microscopic Approaches of Thermodynamics.
				CO2: Apply the laws of thermodynamics to different types of systems. Undergoing various processes and flow system, prepare efficiency of Heat Engine and COP of Heat Pump, Refrigerator.
				CO3: Define the various properties of pure substances, the concept of perfect Gas laws, Carnot engine and also draw the P-V,T-S,P-T and H-S diagrams of pure substance.
				CO4: Define the various non-flow processes, flow processes heat & work Transfer, Vader Waals equation, dryness fraction, Dalton's law of partial pressure, Avogadro's law, enthalpy and entropy.
				CO5: Define the various non-flow processes, flow processes heat & work Transfer, Vader Waals equation, dryness fraction, Dalton's law of partial pressure, Avogadro's law, enthalpy and entropy.
				CO6: Analyze the thermodynamic cycles and evaluate performances Parameters.
6	II/I	ME306PC	Production Technology Lab	**CO1:** Understand the properties of moulding sands.
				CO2: Understand the properties of Pattern making.
				CO3: Understand Fabricate joints using gas welding and arc welding.
				CO4: Evaluate the quality of welded joints.
				CO5: Basic idea of press working tools.
				CO6: Perform molding studies on plastics.
7	II/I	ME307PC	Machine Drawing Practice	**CO1:** Prepare engineering and working drawings with dimensions and bill of material during design and development. Develop assembly drawings using part drawings of machine components.
				CO2: Understand representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.
				CO3: Analyze types of sections – selection of section planes and drawing of sections and auxiliary sectional views.
				CO4: Understand Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features.
				CO5: Analyze title boxes, their size, location and details - common abbreviations and their liberal usage.
				CO6: Compare types of Drawings – working drawings for machine parts.
	II/I		Material Science and Mechanics of	**CO1:** Students will be able to understand basic concepts of stress, strain and their relations based on linear elasticity. Material behaviours due to different types of

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8		ME308PC	Solids Lab	loading will be discussed.
				CO2: Predict the behaviour of the material under impact conditions.
				CO3: Understand the procedure of doing hardness test for different materials.
				CO4: Analyze the different materials applying loads due to compression, tension, shear, torsion.
				CO5: Understand to beams of different type loads duo to the bending moment.
9	II/I	MC309	Constitution of India	**CO1:** Understand meaning, features, characteristics of constitution law and constitutionalism.
				CO2: Describe fundamental rights, fundamental duties and its legal status.
				CO3: Describe The constitution powers and status of the President of India.
				CO4: Understand Emergency Provisions: National Emergency, President Rule, And Financial Emergency.
				CO5: Understand Fundamental Right to Equality, Fundamental Right to certain Freedom under Article 19.
				CO6: Describe the Scope of the Right to Life and Personal Liberty under Article 21.
10	II/II	EE401ES	Basic Electrical and Electronics Engineering	**CO1:** Understand the basic electrical circuit elements and different ac circuits.
				CO2: Understand the installation of different electrical equipments.
				CO3: Describe the working of different transformers.
				CO4: Understand the principles of DC motors.
				CO5: Analyze the different diodes, rectifiers and filters.
				CO6: Understand the principle, applications of BJT and FET.
11	II/II	ME402PC	Kinematics of Machinery	**CO1:** Differentiate suitable mechanisms like four bar chain mechanism, crank slatter quick return motion mechanism for different applications (shaping machine and slotting machine.
				CO2: Draw velocity and displacement diagrams by applying different methods such as instantaneous centre method, graphical method and analysis of mechanism.
				CO3: Different mechanisms in different situations like straight line mechanisms and steering gear mechanisms.
				CO4: Knowledge of the principles to draw the different CAM profiles with different followers.
				CO5: Select the gear and gear trains for the various applications Pinion &gear& pinion and rock arrangement.
	II/II		Thermal Engineering -	**CO1:** Explain the working principle and the components of Internal Combustion engines.
				CO2: Analyze the losses occurs during combustion process and expertise in the concept of combustion

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12		ME403PC	I	process.
				CO3: Describe the operations of reciprocating air compressor and apply their knowledge in compressed air applications.
				CO4: Gain the knowledge in working principles of rotary air compressors such as single and multiple vane, roots, screw and scroll type.
				CO5: Explain and Analyze the various gas turbine power plant and its cycles.
13	II/II	ME404PC	Fluid Mechanics and Hydraulic Machines	**CO1:** Classify the effect of fluid properties on a flow system and also point out pressure and its measurements.
				CO2: Classify type of fluid flow patterns and apply continuity equation, momentum equation, Euler's and Bernoulli's equations for flow along a stream line.
				CO3: Classify boundary layer concepts and submerged objects and also point out drag and lift Force.
				CO4: Develop a variety of practical fluid flow and flow measuring devices and utilize fluid mechanics principles in flow through pipes design.
				CO5: To develop an appropriate turbine with reference to given situation in power plants and also develop impact of jet on vanes.
				CO6: To summarize performance parameters of a given Centrifugal and Reciprocating pumps.
14	II/II	ME405PC	Instrumentation and Control Systems	**CO1:** Understand knowledge of filed instrumentations.
				CO2: Understand the study of measurement of displacement, temperature, pressure measurements.
				CO3: Understand measurement of liquid level and flow, speed, acceleration, vibration measurement.
				CO4: Understand the application of strain gauges.
				CO5: Understand the measurement of humidity, force, torque and power.
				CO6: Understand the study of control systems in processes.
15	II/II	ME407PC	Fluid Mechanics & Hydraulic Machines Lab	**CO1:** Identify importance of various fluid properties at rest and in transit.
				CO2: Apply general governing equations for various fluid flows.
				CO3: Understand the concept of boundary layer theory and flow separation.
				CO4: Plot velocity and pressure profiles for any given fluid flow.
				CO5: Evaluate the performance characteristics of hydraulic turbines.
				CO6: Evaluate the performance characteristics of pumps.
16	II/II	ME408PC	Instrumentation & Control Systems Lab	**CO1:** Characterize and calibrate measuring devices.
				CO2: Identify and analyze errors in measurement.
				CO3: Analyze measured data using regression analysis.
				CO4: Calibration of Pressure Gauges, temperature, LVDT, capacitive transducer and rotameter.

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—				**CO5:** Analyze use of a Seismic pickup for the measurement of vibration amplitude of an engine bed at Various loads.
				CO6: Understand the SCADA system.
17	II/II	EE409ES	Basic Electrical and Electronics Engineering Lab	**CO1:** Understand behavior of different electrical components.
				CO2: Formulate and solve AC,DC circuits.
				CO3: Realize the requirement of transformers.
				CO4: Explain the properties of electromagnetic circuit.
				CO5: Understand the principles of various electrical circuits.
				CO6: Understand working principles of various analogue electrical measuring instruments.
18	II/II	MC409	Gender Sensitization Lab	**CO1:** Develop sensibility with regard to issues of gender in contemporary India.
				CO2: Provide a critical perspective on the socialization of men and women.
				CO3: Determine information about some key biological aspects of genders.
				CO4: Debate on the politics and economics of work.
				CO5: Reflect critically on gender violence.
				CO6: Expose more egalitarian interactions between men and women.
19	III/I	ME501PC	Dynamics of Machinery	**CO1:** Assess the effect of Gyroscopic couple in a dynamic body such as aero plane, 4-wheeler etc.
				CO2: Perform static and dynamic analysis to attain equilibrium in mechanisms.
				CO3: Analyze friction clutches, brakes dynamometer and Governors.
				CO4: Determine balancing mass for rotating and reciprocating mass systems.
				CO5: Perform analysis of the response of one degree freedom system with free and forced vibrations.
20	III/I	ME502PC	Design of Machine Members-1	**CO1:** Apply fundamental design practices with regard to material selection, material properties, manufacturing considerations and standards and codes.
				CO2: Apply stress analysis theory, fatigue theory and appropriate criteria of failure to the design of machine elements.
				CO3: Design and analyze the temporary joints (bolted joints) and permanent joints (riveted and welded joints) under various load conditions.
				CO4: Design solid and hollow shafts under various load conditions.
				CO5: Analyze compression, tension and torsion springs under various load conditions.
	III/I		Metrology & Machine Tools	**CO1:** Differentiate Understand working of lathe, shaper, planner, drilling, milling and grinding machines.
				CO2: Differentiate Comprehend speed and feed

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21		ME503PC		mechanisms of machine tools.
				CO3: Estimate machining times for machining operations on machine tools.
				CO4: Identify techniques to minimize the errors in measurement.
				CO5: Identify methods and devices for measurement of length, angle, and gear& thread parameters, surface roughness and geometric features of parts.
				CO6: Handle the various measuring instruments in quality assurance department of industries.
22	III/I	SM504MS	Business Economics and Financial Analysis	**CO1:** Understand the various forms of Business and impact of economics.
				CO2: Analysis the demand, supply, production, cost.
				CO3: Analyze production, Types of production functions.
				CO4: Understand the market structure and pricing types.
				CO5: Describe the accounting concepts.
				CO6: Understand the ratio analysis.
23	III/I	ME505PC	Thermal Engineering-II	**CO1:** Develop state – space diagrams based on the schematic diagrams of process flow of steam and gas turbine plants.
				CO2 : Apply the laws of Thermodynamics to analyze thermodynamic cycles.
				CO3: Differentiate between vapour power cycles and gas power cycles.
				CO4: Infer from property charts and tables and to apply the data for the evaluation of performance parameters of the steam and gas turbine plants.
				CO5: Understand the functionality of major components of steam and gas turbine plants and to do the analysis of these components.
24	III/I	ME506PC	Operations Research	**CO1:** Understand operations research models.
				CO2: Understand the problem.
				CO3: Describe sequencing.
				CO4: Explain about replacement.
				CO5: Differentiate Theory of games and Inventory.
				CO6: Describe waiting lines and dynamic programming.
25	III/I	ME507PC	Thermal Engineering Lab	**CO1:** Mention working principles of different engines.
				CO2: Evaluate the performance of IC engines and compressors under the given operating conditions.
				CO3: Test the power in the engine cylinder.
				CO4: Find the efficiencies of different engines.
				CO5: Test the frictional power of the engine.
				CO6: Draw timing diagrams for SI/CI engines.
	III/I		Metrology & Machine Tools Lab	**CO1:** Understand step turning, Taper turning on lathe machine.
				CO2: Measure cutting forces on lathe.
				CO3: Explain the measurement of lengths, heights by venire callipers.

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26		ME508PC		**CO4:** Understand the thread measurement by 2-wire , 3-wire methods.
				CO5: Describe the measurement of gear cutting on milling machine.
				CO6: Understand the use of mechanical comparator.
27	III/I	ME509PC	Kinematics & Dynamics Lab	**CO1:** Understand types of motion.
				CO2: Analyze forces.
				CO3: Analyze torques of components in linkages.
				CO4: Differentiate static and dynamic balance.
				CO5: Understand forward and inverse kinematics of open loop mechanisms.
28	III/I	MC510	Intellectual Property Rights	**CO1:** Analyze different types of intellectual property.
				CO2: Express function of trademarks.
				CO3: Understand law of copy rights.
				CO4: Understand law of patents.
				CO5: Explain trade secrets.
29	III/II	ME601PC	Design of Machine Members-II	**CO1:** Gain the Knowledge on journal bearing design using different empirical relations.
				CO2: Select and design a rolling contact bearing for different types of loads and estimate the life of rolling contact bearings.
				CO3: Design the various internal combustion engine components like connecting rod, piston.
				CO4: Design the helical coil springs for different applications under fatigue loading condition.
				CO5: Compare the belts and rope ways based on their power transmission and Application.
				CO6: Knowledge on the strength of gears and various places used different gears depend upon various applications.
30	III/II	ME602PC	Heat Transfer	**CO1:** Explain the basic modes and mechanisms of heat transfer.
				CO2: Analyze one dimensional steady state and unsteady state conduction heat transfer.
				CO3: Solve convective heat transfer problems of natural and forced convection heat transfer.
				CO4: Design the different heat exchanger for various industrial applications like Chemical industry, food processing and refrigeration plants.
				CO5: Compare the boiling, Condensation and radiation heat transfer.
				CO6: Apply the knowledge of heat transfer in aerospace industries.
	III/II		CAD & CAM	**CO1:** Development Of Part Drawings For Various Components In The Form Of Orthographic And Isometric. Representation Of Dimensioning And Tolerances.
				CO2: Generation Of Various 3D Models Through

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31		ME603PC		Protrusion, Revolve, Sweep Creation Of Various Features Study Of Boolean Based Modeling And Assembly Modeling. Study Of Various Standard Translators. Design Of Simple Components, Differentiate Surfaces And Curves.
				CO3: Apply G- Codes and M-Codes for various applications.
				CO4: Able To Study Of Various Post Processors Used In NC Machines. Development Of NC Code For Free Form And Sculptured Surfaces Using CAM Software.
				CO5: Able To Study Of Group Technology And Machining Operations Flexible Manufacturing.
				CO6: Able To Study Of Computer Integrated Technology And Quality Of Control.
32	III/II	ME612PE	Machine Tool Design (Professional Elective-I)	**CO1:** Understand basic motions involved in machine tool.
				CO2: Design machine tool structures.
				CO3: Design and analyze systems for specified speeds and feeds.
				CO4: Select subsystems for achieving high accuracy in machining.
				CO5: Understand control strategies for machine tool operations and apply appropriate quality tests.
33	III/II	MS611OE	Fundamentals of Management for Engineers (Open Elective-I)	**CO1:** Identify the areas to control and Selecting the Appropriate controlling methods/Techniques
				CO2: Develop the process of management's four functions: planning, organizing, leading, and controlling.
				CO3: Analyze and evaluate the influence of historical forces on the current practice of management
				CO4: Examine the circumstances that lead to management evolution and how it will affect future managers
				CO5: Evaluate leadership styles to anticipate the consequences of each leadership style.
34	III/II	ME604PC	Finite Element Methods	**CO1:** Apply finite element method to solve problems in solid mechanics.
				CO2: Formulate and solve the problems in one dimensional structures including trusses , beams and frames.
				CO3: Formulate FE characteristic equations for 2D elements and analyze plain stress , plain strain , axi symmetric and plate bending problems.
				CO4: Understand the basics of finite element analysis.
				CO5: Understand the basics of dynamic analysis.
	III/II			**CO1**: Perform steady state conduction experiments to estimate thermal conductivity of different materials.
				CO2: Perform transient heat conduction experiment.
				CO3: Estimate heat transfer coefficients in forced

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35		ME605PC	Heat Transfer Lab	convection, free convection, condensation and correlate with theoretical values.
				CO4: Obtain variation of temperature along the length of the pin fin under forced and free convection.
				CO5: Perform radiation experiments: Determine surface emissivity of a test plate and Stefan- Boltzmann's constant and compare with theoretical value.
				CO6: Study of heat pipe and its demonstration.
36	III/II	ME606PC	CAD & CAM Lab	**CO1 :** Find out the different between CAD and CAM
				CO2: Learn the modified and zoom commands under the given design conditions.
				CO3: Design different components of automobile.
				CO4: Test the part program in the CNC machine.
				CO5: Observe the group technology.
				CO6: Test the quality of SI /CI engines parts.
37	III/II	EN608HS	Advanced Communication Skills Lab	**CO1:** Speak effectively.
				CO2: Express and communicate fluently and appropriately in social professional contexts.
				CO3: Develop the comprehensive ability through English language enables the students in understanding and assimilating other engineering subjects.
				CO4: The awareness of English lab enriches their communication and soft skills contributing to their overall development and success.
				CO5: Draft various letters and reports for all official purpose.
				CO6: Take part in social and professional communication.
38	III/II	MC609	Environmental Science	**CO1:** Get the information about ecosystem and also about its functions like Food chain, Ecological pyramids etc.,
				CO2: Get the knowledge about the different types of resources like land, water, mineral and energy and also about the effects of environment by the usage of these resources.
				CO3: Gain the knowledge about the ecosystem diversity, its values and also about the importance of the endemic species and different techniques involved in its conservation
				CO4: Gain the knowledge about the different types of pollutions and their control technologies, Waste water treatment, Bio medical waste management etc.,
				CO5: Get the complete information about EIA-Environmental Impact Assessment,
				CO6: Gain the knowledge about environmental policies and regulations.
39	IV/I	ME701PC	CAD/CAM	**CO1:** Development Of Part Drawings For Various Components In The Form Of Orthographic And Isometric. Representation Of Dimensioning And Tolerances.
				CO2: Generation Of Various 3D Models Through Protrusion, Revolve, Sweep Creation Of Various Features Study Of Boolean Based Modeling And

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				Assembly Modeling. Study Of Various Standard Translators. Design Of Simple Components, Differentiate Surfaces And Curves.
				CO3: Apply G- Codes and M-Codes for various applications.
				CO4: Able To Study Of Various Post Processors Used In NC Machines. Development Of NC Code For Free Form And Sculptured Surfaces Using CAM Software.
				CO5: Able To Study Of Group Technology And Machining Operations Flexible Manufacturing.
				CO6: Able To Study Of Computer Integrated Technology And Quality Of Control.
40 —	IV/I	ME702PC	Instrumentation & Control Systems	**CO1:** Characterize and calibrate measuring devices.
				CO2: Identify and analyze errors in measurement.
				CO3: Analyze measured data using regression analysis.
				CO4: Calibration of Pressure Gauges, temperature, LVDT, capacitive transducer and rotameter.
				CO5: Analyze use of a Seismic pickup for the measurement of vibration amplitude of an engine bed at Various loads.
				CO6: Understand the SCADA system.
41	IV/I	ME723PE	Power Plant Engineering (Professional Elective-II)	**CO1:** Understand the concept of Rankine Cycle.
				CO2: Understand the working of boilers including water tube , fire tube and high pressure boilers.
				CO3: Analyze the flow of steam through nozzles.
				CO4: Evaluate the performance of condensers and steam turbines.
				CO5: Evaluate the performance of gas turbines.
42	IV/I	ME733PE	Robotics (Professional Elective-III)	**CO1:** Understand basic components of robots.
				CO2: Differentiate types of robots and robot grippers.
				CO3: Model forward and inverse kinematics of robot manipulators.
				CO4: Analyze forces in links and joints of a robot.
				CO5: Programme a robot to perform tasks in industrial applications.
				CO6: Design intelligent robots using sensors.
43	IV/I	ME741PE	Mechanical Vibrations (Professional Elective-IV)	**CO1:** Understand the causes and effects of vibration in mechanical systems.
				CO2: Develop schematic models for physical systems and formulate governing equations of motion.
				CO3: Understand the role of damping, stiffness and inertia in mechanical systems.
				CO4: Analyze rotating and reciprocating systems and compute critical speeds.
				CO5: Analyze and design machine supporting structures, vibration isolators and absorbers.
44	IV/I	ME703PC	CAD/CAM Lab	**CO1 :** Find out the different between CAD and CAM
				CO2: Learn the modified and zoom commands under the given design conditions.

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				CO3: Design different components of automobile.
				CO4: Test the part program in the CNC machine.
				CO5: Observe the group technology.
				CO6: Test the quality of SI /CI engines parts.
45	IV/I	ME704PC	Instrumentation & Control Systems Lab	**CO1:** Characterize and calibrate measuring devices.
				CO2: Identify and analyze errors in measurement.
				CO3: Analyze measured data using regression analysis.
				CO4: Calibration of Pressure Gauges, temperature, LVDT, capacitive transducer and rotameter.
				CO5: Analyze use of a Seismic pickup for the measurement of vibration amplitude of an engine bed at Various loads.
				CO6: Understand the SCADA system.
46	IV/I	ME705PC	Industry Oriented Mini Project	**CO1:** Able to collaborate with others as they work on intellectual projects.
				CO2: Plan, analyze, design and implement using different tools.
				CO3: Learn to work as a team and to focus on getting a working project done within a stipulated period of time.
47	IV/I	ME706PC	Seminar	**CO1:** Learn public speaking skills by presentations.
				CO2: Understand new technologies in all engineering fields.
				CO3: Improve problem solving skills.
48	IV/II	ME852PE	Fluid Power System (Professional Elective-V)	**CO1:** Understand the Properties of fluids, Fluids for hydraulic systems.
				CO2: Understand governing laws. distribution of fluid power, Design and analysis of typical hydraulic Circuits.
				CO3: Know accessories used in fluid power system, Filtration systems.
				CO4: Understand Maintenance of Fluid Power System.
				CO5: Describe oil hydraulics and pneumatics.
49	IV/II	ME863PE	Unconventional Machining Processes (Professional Elective-VI)	**CO1:** Understand the basic techniques of machining processes modeling.
				CO2: Understand the mechanical aspects of orthogonal cutting mechanics.
				CO3: Understand the thermal aspects of orthogonal cutting mechanics.
				CO4: Ability to extend, through modeling techniques, the single point, multiple point and abrasive machining processes.
				CO5: Estimate the material removal rate and cutting force, in an industrially useful manner, for practical machining processes.
50	IV/II	ME801PC	Major Project	**CO1:** Apply fundamental concepts of areas of study to solve a problem.
				CO2: Use effectively oral, written and visual communication.
				CO3: Work with teams to meet the requirement and to reach the targets.

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Program : I B.TECH		**Academic Year :** 2020-21	**Semester :** I & II

1	I/I	MA101BS	Mathematics – I	**CO1:** Analyze the solution of the system of linear equations in matrix representation.
				CO2: Find the diagonalization of the matrix.
				CO3: Compare the convergence between two tests for the given sequence.
				CO4: Evaluate Improper integrals using Beta and Gamma functions.
				CO5: Explain the concept of total derivative.
				CO6: Find the Maxima and Minima of functions of two variables and three variables.
2	I/I	AP102BS	Applied Physics	**CO1:** Explain the fundamental concepts on Quantum behavior of matter.
				CO2: Explain the working principle and structure of various semiconductors.
				CO3: Describe the characteristics of semiconductor photo detectors.
				CO4: Distinguish the principle of lasers.
				CO5: Apply the fiber optics principles in various communications.
				CO6: Analyze the Characteristics of dielectric and magnetic material.
3	I/I	CS103ES	Programming for Problem Solving	**CO1:** Recognize various types of operators, data types and understand the definition of algorithm and flowchart.
				CO2: Apply various Branching/Looping statements, structure of c program to solve the given problem.
				CO3: Classify homogeneous derived data types and use them to solve the problems.
				CO4: Distinguish Text files and Binary Files and define the pre-processor directives, write simple c program using File handling functions.
				CO5: Illustrate how structured programming, Recursion works and write programs using recursion to solve problems and memory allocation.
				CO6: Apply Algorithms for searching and sorting techniques.
4	I/I	ME104ES	Engineering Graphics	**CO1:** Broad idea in engineering drawing and conventions. Application of geometric and curves drawing in tool design such as helical curve in the design of drill bits.
				CO2: Understanding orthographic projections in sense projections of points, lines, Planes.
				CO3: Developing a clear idea on projections of solids and auxiliary views and sectional views.
				CO4: Acquiring practical knowledge by means of

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				development of surface drawing, and intersection of solids.
				CO5: Thorough knowledge in Isometric views and conversion of isometric views into orthographic views and vice versa also acquiring prerequisite knowledge in CAD commands and package.
5	I/I	CH102BS	Chemistry	**CO1:** Analyze the type of crystal field splitting in complexes.
				CO2: Develop the water free from hardness using water technology.
				CO3: Solve the problems of E.M.F, Electrode Potential.
				CO4: Recognize which part of alloy acts as Anode.
				CO5: Predict the Configuration of the given compound.
				CO6: Apply the spectral data to find the structure of a compound.
6	I/I	EE103ES	Basic Electrical Engineering	**CO1:** Known's the knowledge about basic components of electrical and reduction method in network analysis in DC.
				CO2: Gains the knowledge about AC quantities.
				CO3: Gains the knowledge about the energy transfer.
				CO4: Gains the knowledge about use of 3-ph transformers.
				CO5: Analysing the energy conversion systems in electrical.
				CO6: Gains knowledge about basic electrical installation.
7	I/I	EN105HS	English	**CO1:** Use English language effectively in spoken and written forms.
				CO2: Inculcate reading habits & gain effective reading skills and vocabulary.
				CO3: Develop listening skills.
				CO4: Comprehend the given text and respond appropriately.
				CO5: Communicate confidently in various contexts and different cultures.
				CO6: Acquire basic proficiency in English including L.S.R.W skills.
8	I/I	PH102BS	Engineering Physics	**CO1:** Explain the fundamental concepts on Quantum behaviour of matter.
				CO2: Explain the working principle and structure of various semiconductors.
				CO3: Describe the characteristics of semiconductor photo detectors.
				CO4: Distinguish the principle of lasers.
				CO5: Apply the fibre optics principles in various communications.
				CO6: Analyze the Characteristics of dielectric and magnetic material.
9	I/I	AP105BS	Applied Physics Lab	**CO1:** Classify the matter wave behavior using quantum principles.
				CO2: Distinguish the intrinsic and extrinsic semiconductors.
				CO3: Recognize the fundamental characteristics of optoelectronic devices.
				CO4: Recognize the fundamental applications of optoelectronic devices.
				CO5: Demonstrate competency and understanding of the concepts found in lasers and fiber optics on a broad base of

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				knowledge in physics.
				CO6: Define the Basic principle of Electromagnetic laws and their applications in different materials.
10	I/I	CS106ES	Programming for Problem Solving Lab	**CO1:** Solve the Problems by using Operators and type casting.
				CO2: Write the programs based on Branching and Looping statements.
				CO3: Illustrate the Problems by using the recursion and Functions.
				CO4: Analyze the programs based on Derived Data type.
				CO5: Develop the programs using Files.
				CO6: Solve the Problems by using the Searching and Sorting Technique.
11	I/I	CH106BS	Engineering Chemistry Lab	**CO1:** Acquire the scientific attitude by means of distinguishing, analyzing and solving Engineering problems.
				CO2: Interpret the knowledge of atomic orbital's, molecular and electronic changes, Band theory related to Conductivity.
				CO3: Differentiate between hard & soft water and their effects when used in Thermal Power Plants.
				CO4: Summarize the principles and concepts of Electrochemistry, Corrosion and Mechanism associated with corrosion control methods.
				CO5: Apply the concept of basic Spectroscopy to medical and other fields.
				CO6: Compare the Configurational and conformational analysis of molecules and Reaction mechanisms.
12	I/I	EN107HS	English Language and Communication Skills Lab	**CO1:** Better understanding of nuances of English language through audio-visual experience and group activities.
				CO2: Neutralization of accent for intelligibility.
				CO3: Speaking skills with clarity and confidence which in turn enhance their employability skills.
13		PH105BS		**CO1:** Classify the Newton's laws both in Cartesian, cylindrical and spherical coordinates.
				CO2: Distinguish the different types of mechanical and electrical harmonic oscillators.
				CO3: Recognize the fundamentals of transverse waves of strings in one dimension.
	I/I		Engineering Physics Lab	**CO4:** Recognize the fundamentals of longitudinal waves of strings in one dimension.
				CO5: Demonstrate competency and understanding of the concepts found in Wave Optics on a broad base of knowledge in physics.
				CO6: Define the Basic principle of LASERS and their application as light propagation in fiber optics and optical fibers Properties.
	I/II		Mathematics – II	**CO1:** Identify whether the given differential equation of first order is exact or not and analyze the applications of differential equations.

SRI INDU INSTITUTE OF ENGINEERING & TECHNOLOGY

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Recognized under 2(f) of UGC Act 1956.

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14		MA201BS		**CO2:** Solve the second and higher order differential equations find the particular integrals for the given non homogeneous differential terms.
				CO3: Evaluate the multiple integrals and apply the concept to find areas, volumes of sphere and rectangular parallelepiped.
				CO4: Analyze the double integral and triple integral concept in polar form and cartetian form.
				CO5: Differentiate the problems on gradient,divergent and curl of a vectors.
				CO6: Summerize the line,surface and volume integrals and converting them in theorems.
15	I/II	ME203ES	Engineering Mechanics	**CO1:** Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces.
				CO2: Describe static equilibrium of particles and rigid bodies both in two dimensions and also in three dimensions.
				CO3: Solve problem of bodies subjected to friction.
				CO4: Find the location of centroid and calculate moment of inertia of given section.
				CO5: Understand kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.
				CO6: Solve the problems using work energy equations for translations, fixed axis of rotation and plane motion.
16	I/II	EE208ES	Basic Electrical Engineering Lab	**CO1:** Understand behavior of different electrical components.
				CO2: Formulate and solve AC, DC circuits.
				CO3: Realize the requirement of transformers.
				CO4: Explain the properties of electromagnetic circuit.
				CO5: Understand the principles of various electrical circuits.
				CO6: Understand working principles of various analogue electrical measuring instruments.
17	I/II	ME205ES	Engineering Workshop	**CO1:** Study and practice on hand operated tools and their uses.
				CO2: Design and model the prototypes by using carpentry and tin Smithy tools.
				CO3: Join the metals by using welding and fitting trade
				CO4: Produce casting using foundry.
				CO5: Perform various basic house wiring functions.
				CO6: Bend and design the model using blacksmith trade.