FIRST YEAR

Course Outcomes and Program Outcomes

(A) PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO's)

PSO1: Foundation of Computer System Development: Ability to use knowledge of computer systems and design principles in building the hardware and software components / products in the domain of embedded system, artificial intelligence, databases, networking, web technology and mobile computing.

PSO2: Problem Solving Ability: Ability to apply knowledge in various problem domains and implement innovative / suitable solutions to cater to needs of industry, business and e-governance by imbibing highest ethical and economical values.

Head
First Year Engg. Dept
PRMIT & R, Badnera

(B) COURSE OUTCOMES

Engineering Mathematics I (10COF101) - Year of Study: 2017-18, 2018-19	
Course outcome code	**Course outcome** After the completion of course students will be able to…
10COF101.1	Make use of derivatives of a continuous function into a polynomial and solve indeterminate forms.
10COF101.2	Extend the basic ideas of the calculus of functions of single variables to functions of several variables and its concept.
10COF101.3	Explain functional dependence, maximum and minimum values of a functions.
10COF101.4	Compare real and imaginary equations and evaluate it.
10COF101.5	Solve certain types of differential equations and utilize it for engineering problems of electronics, electrical circuit.

Engineering Physics(10COF102) - Year of Study: 2017-18, 2018-19	
Course outcome code	**Course outcome** After the completion of course students will be able to…
10COF102.1	The students will be able to classify semiconductors and explain the working of diodes using band theory of solids.
10COF102.2	The students will be able to apply the knowledge of Compton scattering, de-Broglie's matter waves, Heisenbergs Uncertainty Principle.
10COF102.3	The students will be able to utilize knowledge of electric and magnetic fields in mass spectrograph and cathode ray oscilloscope.
10COF102.4	The students will be able to understand and utilize the knowledge of interference & diffraction of light, optical fibers and lasers.
10COF102.5	The students will make use of the knowledge of fluid dynamics , ultrasonic waves and acoustics in various applications.
10COF102.6	The students will be able to develope experimental skills and identify the appropriate application of particular experiment.

Head
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ENGINEERING MECHANICS (10COF 103) Year of Study: 2017-18, 2018-19	
Course outcome code	**Course Outcomes** After the completion of course students will be able to
10COF 103.1	Organize and solve the forces along with its effect.
10COF 103.2	Apply principles of statics to the system of rigid bodies to solve simple structures.
10COF 103.3	Determine frictional forces for simple contacts, wedges and in coil friction.
10COF 103.4	Evaluate centroid & moment of inertia for 2-D structures.
10COF 103.5	Utilise the kinematic and kinetic equations.
10COF 103.6	Elaborate the concepts related to engineering mechanics, determine the lifting machine parameters and prove it graphically.

Engineering Drawing (10COF104) - Year of Study: 2017-18, 2018-19	
Course outcome code	**Course outcome** After the completion of course students will be able to…
10COF104. 1	Construct the mathematical curves in Engineering applications.
10COF104. 2	Explain basic views related to projection of Line & Plane.
10COF104. 3	Identify the pictorial views of the object.
10COF104. 4	Explain the methods of projection.
10COF104. 5	Define the sectional views of solids such as Prism, Pyramid, Cone, Cylinder & Cube.
10COF104. 6	Develop free hand sketches of multiple views from pictorial object.

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Workshop- I (10COF105) - Year of Study: 2017-18, 2018-19	
Course outcome code	**Course outcome** After the completion of course students will be able to…
10COF105.1	Create various prototypes in the Smity such as forming square/ hexagonal head bolt and hook.
10COF105.2	Create and Demonstrate various prototypes in the Smity such as making various profile shape.
10COF105.3	Define Fitting such as Straight Fit, and V fit.
10COF105.4	Apply the knowledge of Fitting such as filing hack saw cutting, drilling and tapping.
10COF105.5	Make use of combine internal and external threading.
10COF105.6	Improve various Prototypes in Plumbing

Engineering Mathematics II (10COF106) - Year of Study: 2017-18, 2018-19	
Course outcome code	**Course outcome** After the completion of course students will be able to…
10COF106.1	Make use of system of equations in matrix forms.
10COF106.2	Find the periodic functions as an infinite series.
10COF106.3	Apply knowledge of vector algebra, rule of differentiation under integral sign and construct curves from equations.
10COF106.4	Solve integral by using new techniques such as Gamma and Beta functions, reduction formulae.
10COF106.5	Evaluate double integral, triple integral and its applications.

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Engineering Chemistry (10COF107) - Year of Study: 2017-18, 2018-19	
Course outcome code	**Course outcome** After the completion of course students will be able to…
10COF107.1	Describe properties of hard water, its disadvantages and various softening processes of water use for generation of steam.
10COF107.2	Identify various types of corrosion, mechanism and control methods to protect metal.
10COF107.3	Apply the knowledge of useful engineering materials such as cement, lubricant, polymers and nano materials.
10COF107.4	Describe various properties of chemical fuel and lubricant and explain the mechanism of lubrications.
10COF107.5	Identify various aspects of environment, harmful effect on environment and use of pollution control equipment.
10COF107.6	Determine the properties of useful engineering materials such as water, chemical fuel, lubricant based on laboratory technique.

Electrical Engineering (10COF108) - Year of Study: 2017-18, 2018-19	
Course outcome code	**Course outcome** After the completion of course students will be able to…
10COF108.1	Find basic parameters of DC circuits like voltage, currents and resistance using theorems and transformation techniques.
10COF108.2	Explain the different properties of electromagnets and phenomenon of electromagnetic induction in magnetic circuits.
10COF108.3	Utilize the different terms of AC so as to build series and parallel AC circuits.
10COF108.4	Simplify three phase system using star and delta connection to balance three phase load in high voltage applications.
10COF108.5	Compare types and characteristics of Transformers as well as DC motors to decide their exact field of applications.
10COF108.6	Discuss about the use of measuring instruments and safety precautions so as to operate electrical equipments and experimental kits in real time applications.

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COMPUTER PROGRAMMING (10COF109) Year of Study: 2017-18, 2018-19	
Course outcome code	Course Outcomes After the completion of course students will be able to
10COF 109.1	Understand basics of computer system, algorithms, searching and sorting.
10COF 109.2	Explain the basics of C program, reading and writing characters.
10COF 109.3	Make use of control statement, functions and recursion.
10COF 109.4	Utilize array and string concept.
10COF 109.5	Design pointers, structure, union and file concept.
10COF 109.6	Apply programming concepts to solve real life programming problems.

Workshop -II (10COF110) - Year of Study: 2017-18, 2018-19	
Course outcome code	**Course outcome** After the completion of course students will be able to…
10COF110.1	Make use of hand tool and power tool.
10COF110.2	Classify Diffrent operation of machine tool.
10COF110.3	various profile shape with metal sheet.
10COF110.4	Applying the Knowledge of Joining various metal with help of filler metals.
10COF110.5	Summarize the operation of wood turning machine.
10COF110.6	Categorize the Diffrent temperature and pressure.

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(B) COURSE OUTCOMES

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Electrical Engineering (10COF108) - Year of Study: 2017-18, 2018-19	
Course outcome code	**Course outcome** After the completion of course students will be able to…
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10COF108.3	Utilize the different terms of AC so as to build series and parallel AC circuits.
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10COF110.3	various profile shape with metal sheet.
10COF110.4	Applying the Knowledge of Joining various metal with help of filler metals.
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Engineering Mathematics I(19COF101) - Year of Study: 2019-20,2020-21,2021-22	
Course outcome code	**Course outcome** After the completion of course students will be able to…
19COF101.1	Make use of derivatives of a continuous function into a polynomial and solve indeterminate forms.
19COF101.2	Extend the basic ideas of the calculus of functions of single variables to functions of several variables and its concept.
19COF101.3	Compare real and imaginary equations and evaluate it.
19COF101.4	Solve certain types of differential equations and utilize it for engineering problems of electronics, electrical circuit.
19COF101.5	Determine infinite series and their convergence and divergence.

Engineering Physics(19COF102) - Year of Study: 2019-20,2020-21,2021-22	
Course outcome code	**Course outcome** After the completion of course students will be able to…
19COF102.1	The students will be able to classify semiconductors and explain the working of diodes using band theory of solids.
19COF102.2	The students will be able to apply the knowledge of Quantum physics, Compton scattering, de-Broglie's matter waves, Heisenbergs Uncertainty Principle.
19COF102.3	The students will be able to utilize knowledge of electric and magnetic fields in mass spectrograph and cathode ray oscilloscope.
19COF102.4	The students will be able to understand and utilize the knowledge of interference & diffraction of light, optical fibers and lasers.
19COF102.5	The students will make use of the knowledge of fluid dynamics , ultrasonic waves and acoustics in various applications.
19COF102.6	The students will be able to develope experimental skills and identify the appropriate application of particular experiment.

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ENGINEERING MECHANICS (19COF 103) Year of Study: 2019-20,2020-21,2021-22	
Course outcome code	**Course Outcomes** After the completion of course students will be able to
19COF 103.1	Organize and solve the forces along with its effect.
19COF 103.2	Apply principles of statics to the system of rigid bodies to solve simple structures.
19COF 103.3	Determine frictional forces for simple contacts, wedges and in coil friction.
19COF 103.4	Evaluate centroid & moment of inertia for 2-D structures.
19COF 103.5	Utilise the kinematic and kinetic equations.
19COF 103.6	Elaborate the concepts related to engineering mechanics, determine the lifting machine parameters and prove it graphically.

COMPUTER PROGRAMMING (19COF104) 2019-20,2020-21,2021-22	
Course outcome code	Course outcomes After the completion of course students will be able to
19COF 104.1	Explain the fundamental of computer and computing concepts.
19COF 104.2	Discuss the fundamental of C language.
19COF 104.3	Illustrate the use of operators, expression and input-output operations.
19COF 104.4	Explain conditional branching, iteration and jumping statement.
19COF 104.5	Design functions, pointer, array & structures, use of string & file concepts.
19COF 104.6	Apply programming concepts to solve real life programming problems.

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Workshop Practice (19COF105) - Year of Study: 2019-20,2020-21,2021-22	
Course outcome code	**Course outcome** After the completion of course students will be able to…
19COF105.1	Upon completion of this course, the students will be able to Expain and Demonstrate different manufacturing processes which are commonly appyled in industry.
19COF105.2	How to devlop the components using various manufacturing techniques.
19COF105.3	Analyze dimensional accuracy and match tolerances.
19COF105.4	Design and will model of various prototypes in the Smity such as forming square/ hexagonal head bolt and hook.
19COF105.5	Create different Jobs in Fitting such as filing hack saw cutting, drilling and tapping.
19COF105.6	Applying knowledge of foundry suchs as and molding, patterns , types of molding sands.

Engineering Mathematics II (19COF106) - Year of Study: 2019-20,2020-21,2021-22	
Course outcome code	**Course outcome** After the completion of course students will be able to…
19COF l 06.1	Make use of system of equations in matrix forms.
19COF l 06.2	Find the periodic functions as an infinite series.
19COF l 06.3	Solve integral by Beta, Gamma functions and reduction formulae.
19COF l 06.4	Construct a curve from equation and apply differentiation under integral sign.
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Engineering Chemistry (19COF107) - Year of Study: 2019-20,2020-21,2021-22	
Course outcome code	**Course outcome** After the completion of course students will be able to…
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19COF107.2	Identify various types of corrosion, mechanism and control methods to protect metal and explain energy storage system and its applications.
19COF107.3	Apply the knowledge of useful engineering materials such as cement, lubricant, industrial and polymeric materials.
19COF107.4	Apply the knowledge of properties of chemical fuel based on analysis and numerical data.
19COF107.5	Identify the various phases of system and complex compound by using thermodynamic variables and describe various spectrophotometric technique.
19COF107.6	Determine the properties of useful engineering materials such as water, chemical fuel, lubricant based on laboratory technique.

Basic Electrical Engineering (19COF108) - Year of Study: 2019-20,2020-21,2021-22	
Course outcome code	**Course outcome** After the completion of course students will be able to…
19COF108.1	Find basic parameters of DC circuits like voltage, currents and resistance using theorems and transformation techniques.
19COF108.2	Explain the different properties of electromagnets and phenomenon of electromagnetic induction in magnetic circuits.
19COF108.3	Utilize the different terms of AC so as to build series and parallel AC circuits.
19COF108.4	Simplify three phase system using star and delta connection to balance three phase load in high voltage applications.
19COF108.5	Compare types and characteristics of Transformers as well as DC motors to decide their exact field of applications.
19COF108.6	Discuss about the use of measuring instruments and safety precautions so as to operate electrical equipments and experimental kits in real time applications.

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Engineering Graphics (19COF109) - Year of Study: 2019-20,2020-21,2021-22	
Course outcome code	**Course outcome** After the completion of course students will be able to…
19COF109. 1	Make use of the drawing instruments effectively to dimension the given figures.
19COF109. 2	Explain the methods of projection.
19COF109. 3	Define the sectional views of solids such as Prism, Pyramid, Cone, Cylinder & Cube.
19COF109. 4	Identify the pictorial views of the object.
19COF109. 5	Construct isometric scale, isometric projection & views.
19COF109. 6	Develop the lateral surfaces of primitive solids by using CAD Software.

English Communication Skill Lab (19COF110) - Year of Study: 2019-20, 2020-21, 2021-22	
Course outcome code	**Course outcome** After the completion of course students will be able to…
19COF110.1	Recall the fundamental concepts of English language for communication purpose.
19COF110.2	Demonstrate their ability to discuss in English language.
19COF110.3	Develop their communication skills through group discussion.
19COF110.4	Simplify their presentation skill through reading comprehension and extempore.
19COF110.5	Find effective textual contents for improved communication through story and article writing.
19COF110.6	Elaborate effective ways for healthy conversation to make their point of views clear to the listeners.

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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.
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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.

Program Specific Outcomes (PSO's)

PSO1: Foundation of Computer System Development: Ability to use knowledge of computer systems and design principles in building the hardware and software components / products in the domain of embedded system, artificial intelligence, databases, networking, web technology and mobile computing.

PSO2: Problem Solving Ability: Ability to apply knowledge in various problem domains and implement innovative / suitable solutions to cater to needs of industry, business and e-governance by imbibing highest ethical and economical values.

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Engineering Mathematics I(19COF101) - Year of Study: 2019-20,2020-21,2021-22	
Course outcome code	**Course outcome** After the completion of course students will be able to…
19COF101.1	Make use of derivatives of a continuous function into a polynomial and solve indeterminate forms.
19COF101.2	Extend the basic ideas of the calculus of functions of single variables to functions of several variables and its concept.
19COF101.3	Compare real and imaginary equations and evaluate it.
19COF101.4	Solve certain types of differential equations and utilize it for engineering problems of electronics, electrical circuit.
19COF101.5	Determine infinite series and their convergence and divergence.

Engineering Physics(19COF102) - Year of Study: 2019-20,2020-21,2021-22	
Course outcome code	**Course outcome** After the completion of course students will be able to…
19COF102.1	The students will be able to classify semiconductors and explain the working of diodes using band theory of solids.
19COF102.2	The students will be able to apply the knowledge of Quantum physics, Compton scattering, de-Broglie's matter waves, Heisenbergs Uncertainty Principle.
19COF102.3	The students will be able to utilize knowledge of electric and magnetic fields in mass spectrograph and cathode ray oscilloscope.
19COF102.4	The students will be able to understand and utilize the knowledge of interference & diffraction of light, optical fibers and lasers.
19COF102.5	The students will make use of the knowledge of fluid dynamics , ultrasonic waves and acoustics in various applications.
19COF102.6	The students will be able to develope experimental skills and identify the appropriate application of particular experiment.

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ENGINEERING MECHANICS (19COF 103) Year of Study: 2019-20,2020-21,2021-22	
Course outcome code	**Course Outcomes** After the completion of course students will be able to
19COF 103.1	Organize and solve the forces along with its effect.
19COF 103.2	Apply principles of statics to the system of rigid bodies to solve simple structures.
19COF 103.3	Determine frictional forces for simple contacts, wedges and in coil friction.
19COF 103.4	Evaluate centroid & moment of inertia for 2-D structures.
19COF 103.5	Utilise the kinematic and kinetic equations.
19COF 103.6	Elaborate the concepts related to engineering mechanics, determine the lifting machine parameters and prove it graphically.

COMPUTER PROGRAMMING (19COF104) 2019-20,2020-21,2021-22	
Course outcome code	Course outcomes After the completion of course students will be able to
19COF 104.1	Explain the fundamental of computer and computing concepts.
19COF 104.2	Discuss the fundamental of C language.
19COF 104.3	Illustrate the use of operators, expression and input-output operations.
19COF 104.4	Explain conditional branching, iteration and jumping statement.
19COF 104.5	Design functions, pointer, array & structures, use of string & file concepts.
19COF 104.6	Apply programming concepts to solve real life programming problems.

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Workshop Practice (19COF105) - Year of Study: 2019-20,2020-21,2021-22	
Course outcome code	**Course outcome** After the completion of course students will be able to…
19COF105.1	Upon completion of this course, the students will be able to Expain and Demonstrate different manufacturing processes which are commonly appyled in industry.
19COF105.2	How to devlop the components using various manufacturing techniques.
19COF105.3	Analyze dimensional accuracy and match tolerances.
19COF105.4	Design and will model of various prototypes in the Smity such as forming square/ hexagonal head bolt and hook.
19COF105.5	Create different Jobs in Fitting such as filing hack saw cutting, drilling and tapping.
19COF105.6	Applying knowledge of foundry suchs as and molding, patterns , types of molding sands.

Engineering Mathematics II (19COF106) - Year of Study: 2019-20,2020-21,2021-22	
Course outcome code	**Course outcome** After the completion of course students will be able to…
19COF l 06.1	Make use of system of equations in matrix forms.
19COF l 06.2	Find the periodic functions as an infinite series.
19COF l 06.3	Solve integral by Beta, Gamma functions and reduction formulae.
19COF l 06.4	Construct a curve from equation and apply differentiation under integral sign.
19COF l 06.5	Evaluate double integral, triple integral and its applications.

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Engineering Chemistry (19COF107) - Year of Study: 2019-20,2020-21,2021-22	
Course outcome code	**Course outcome** After the completion of course students will be able to…
19COF107.1	Describe properties of hard water, its disadvantages and various softening processes of water use for generation of steam.
19COF107.2	Identify various types of corrosion, mechanism and control methods to protect metal and explain energy storage system and its applications.
19COF107.3	Apply the knowledge of useful engineering materials such as cement, lubricant, industrial and polymeric materials.
19COF107.4	Apply the knowledge of properties of chemical fuel based on analysis and numerical data.
19COF107.5	Identify the various phases of system and complex compound by using thermodynamic variables and describe various spectrophotometric technique.
19COF107.6	Determine the properties of useful engineering materials such as water, chemical fuel, lubricant based on laboratory technique.

Basic Electrical Engineering (19COF108) - Year of Study: 2019-20,2020-21,2021-22	
Course outcome code	**Course outcome** After the completion of course students will be able to…
19COF108.1	Find basic parameters of DC circuits like voltage, currents and resistance using theorems and transformation techniques.
19COF108.2	Explain the different properties of electromagnets and phenomenon of electromagnetic induction in magnetic circuits.
19COF108.3	Utilize the different terms of AC so as to build series and parallel AC circuits.
19COF108.4	Simplify three phase system using star and delta connection to balance three phase load in high voltage applications.
19COF108.5	Compare types and characteristics of Transformers as well as DC motors to decide their exact field of applications.
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Course outcome code	**Course outcome** After the completion of course students will be able to…
19COF109. 1	Make use of the drawing instruments effectively to dimension the given figures.
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19COF109. 3	Define the sectional views of solids such as Prism, Pyramid, Cone, Cylinder & Cube.
19COF109. 4	Identify the pictorial views of the object.
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English Communication Skill Lab (19COF110) - Year of Study: 2019-20, 2020-21, 2021-22	
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19COF110.1	Recall the fundamental concepts of English language for communication purpose.
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Course Outcomes and Program Outcomes

(A) PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
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UG-CIVIL

Prof. Ram Meghe Institute of Technology & Research Badnera , Amravati
PO, PSO & CO (Civil Engineering)
AY 2017-18

Program Outcomes

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

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PO3: Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, 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 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 modeling to complex engineering activities with an understanding of the limitations.

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

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PO11: Project Management and Finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

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 Specific Outcomes (PSO's)

PO13: Technical Solution for construction Industry: Able to think and find solutions for planning, analysis, safe and economical design and estimation of civil engineering structures and services.

PO14: Entrepreneurial and Management skills: Able to establish startup in the field of Structural Design, Estimating & costing, Surveying, Soil Engineering, Environmental Engineering and in Transportation Engineering etc, also can execute projects and provide a managerial solution to the construction Industry.

Course Outcomes

Semester –III

3CE01 MATHEMATICS III

1. Demonstrate the knowledge of differential equations and partial differential equations, applied to electrical engineering systems.
2. Apply Laplace transform to solve differential equations.
3. Demonstrate the use of Partial Differential Equations.
4. Compute different Numerical Methods.
5. Apply the knowledge of Complex Analysis.
6. Demonstrate the basic concepts of probability and statistics.

3CE02 STRENGTH OF MATERIALS

1. Explain mechanical properties of material, the concepts of stress and strain at a point and the stress-strain relationships, theory of simple bending, shear stresses & strain energy. (L2: Understand)
2. Calculate the stresses and strains in the members subjected to axial, bending and torsional loads and Shear & Bending Stresses. (L3: Apply)
3. Analyze the beam and draw axial force, shear force and bending moment, bending and shear stress distribution diagram for all types of loading. (L4:Analyze).
4. Solve problems using concept of theory of torsion & calculate the principal stresses and

strains in structural members.(L3: Apply)

5. Develop slope and deflection equations to find values of slope and deflection of beams subjected to loads.(L3: Apply)

6. Apply & utilize the theoratical & practical knowledge for performing shear, compression, modulus of rupture, hardness, deflection of spring & beam, Impact and Tension test on specimen. (L3: Apply)

3CE03 TRANSPORTATION ENGINEERING –I

1. Remembering the basics of transportation systems and various properties of materials used for road construction. (L1:Remembering)

2. Explain the construction aspects of roadways and their cross sectional elements of roads. (L2:Explain)

3. Design & analysis of flexible & rigid pavement, analysis for wheel lo (ad & temperature stresses in rigid pavement. (L6 : Design)

4. Understanding the concept of traffic engineering & traffic regulations for driving motor vehicles. (L2: Understanding)

5. Estimating flood discharge, water way, scour depth, depth of foundation, afflux, clearance and freeboard Also Understanding the components of bridge & different structural forms of culverts, causeway, bridges,etc. (L5: Estimate)

6. Determine properties of aggregates and bitumen. (L5:Determine)

3 CE04 BUILDING CONSTRUCTION & MATERIALS

1. Identify and characterize building materials (L3: Applying)
2. Understand the manufacturing process of bricks .(L6: Creating)
3. Identify the methods for preservation of timber .(L3: Applying)
4. Identify the factors to be considered in construction of buildings. (L3: Applying)
5. Understand the construction practices and techniques (L6: Creating)
6. Understand the techniques of damp proofing and fire resistance .(L2: Understanding)

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Head
Dept. of Civil Engineering
P.R.M.I.T. & R., Badnera-Amravati

Semester – IV

4CE01: GEOTECIINICAL ENGINEERING – I

1. Explain the index and engineering properties of soil for its classification (L2): Understand
2. Elaborate the concept of soil compaction and quality control in feild. (L6): Create
3. Determine the permeability of soil and explain methods of dewatering. (L5): Evaluate
4. Determine the seepage discharge and design the graded filter. (L5): Evaluate
5. Understand the concept of consolidation and stress distribution in soil mass. (L2): Understand
6. Determine the Specific Gravity, Density, Atterrberg Limits, CBR, Shear Strength Parameters and Unconfied Compressive Strength of soil which helps in designing a structure. (L5): Evaluate

4CE02 FLUID MECHANICS – I

1. Apply their knowledge of basic fluid properties in fluid mechanics .(L4- Apply)
2. Solve problem in fluid statics and kinematics.(L6-Solve)
3. Solve problems in fluid dynamics and flow measurement.(L6-Solve)
4. Analysis the performance of flow instruments.(L4- Analysis,L6-Design)
5. Elaborate the knowledge in flow through pipes.(L6- Elaborate)
6. Discuss the drag and lift force. (L6- Discuss)

4CE03 : THEORY OF STRUCTURES – I

1. Students will be able to decide the method of analysis according to the type of structural element. (L5: Evaluating)
2. Students will be able to explain degree of freedom, Condition of equilibrium, Stiffness and determinacy of element. (L2: Understanding)
3. Students will be able to apply the knowledge of Castigliano's theorem for finding deflection in truss, beam & frame (L3: Applying)
4. Students will be able to apply the various analysis methods for analysis of structural member. (L4: Analyzing)
5. Students will be able to analyze the 3 hinged arches. (L4: Analyzing)

4CE04 SURVEYING –I

1. Identify to know the need surveying and Geo-informatics.
2. Decide and learn use of different instrument, tools for linear measurement

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3. Understand importance of different types of levels and its parts for measurment of elevations.

4. Determine bearing and angles by different tools, instrument.

5. Explain purpose of traversing by different method

6. Apply knowledge of theory to perform surveying on field

4CE05 REINFORCED CEMENT CONCRETE – I

1. Identify to know the need and composition of binding material , cement

2. Decide and utilise the admixture as per need of concrete

3. Understand importance of mix design

4. Analysis components of RCC like slab and beam

5. Explain need for repairs, interaction between permeability volume change and cracking, various repair materials and techniques available.

6. Apply knowledge of theory to perform different test on various material use in concrete technology

Semester - V

5CE01: REINFORCED CEMENT CONCRETE – IIII

1. Design the water tanks with rigid & flexible base using IS code.
2. Explain 1) LSM & WSM 2) Basic concept of singly reinforced beam & flange beam.
3. Solve the problem on Reinforced Concrete Columns and footings , beam.
4. Predict serviceability of structures
5. Interpret earthquake resistant construction.

5CE02: FLUID MECHANICS-II

1. Apply their knowledge of fluid mechanics in addressing in open channels.(L4- Apply)
2. Solve problem in uniform, gradually and rapidly varied flow in steady conditions.(L6-Solve)
3. Design construction as well as efficient working various type of hydraulic structure and machine is considerably simplified by using dimensional analysis and model study.(L6-Design)
4. Analysis and design the impact of jet on vanes which is a base of turbo machines.(L4-Analysis,L6-Design)
5. Elaborate the knowledge in hydraulic machines.(L6- Elaborate)

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6. Demonstrate the working of turbine and pumps. (L2- Demonstrate)

5CE03: BUILDING PLANNING AND CAD

1. Explain importance of building drawing for Civil Engineering in construction and industry. (L2: Understand)
2. Explain principals of planning and how climate effect on building planning. (L2: Understand)
3. Develop line plan of residential and commercial building. Calculate number of staircase, planning and drawing. (L3: Apply).
4. Apply & utilize the knowledge of building bye laws and principals of planning and develop working and submission drawing as per owner's requirements. (L3: Apply)

5CE04: SURVEYING-II

1 Demonstrate the application of tachometric surveying for calculating horizontal and vertical distances (L2)

2 Apply the knowledge of curve surveying for setting out curves. (L3)

3 Compare triangulation surveying with plain surveying (L5)

4 Elaborate the methods of hydrographic and underground surveying (L6)

5 Determine the geometric properties of object from photogrammetric image (L5)

6 Explain use of GIS and GPS (L2)

Semester- VI

6CE01: NUMERICAL METHODS AND COMPUTER PROGRAMMING

1. Explain spreadsheet and FORTRAN commands giving typical usage examples.(L2: Understand)
2. Develop flowcharts, programs and spreadsheets for performing basic mathematical operations encountered in civil engineer's day to day work life, applying knowledge of mathematics and programming logic.(L3: Apply, PO1, PO5)
3. Develop spreadsheets and programs for solving simple Civil Engineering tasks. (L3: Apply, PO1, PO5)
4. Develop own program for solving Civil Engineering problems using knowledge of Numerical Methods. (L6: Create, PO1,PO5)
5. Identify ways for simplifying program logic using various language features. (L4: Analyze, PO2, PO4, PO5)

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6. Propose ways to solve complex Civil Engineering Design and Automation problems using own programs, spreadsheets and commercial software.(L6: Create, PO4, PO5)

6CE02: DESIGN OF RCC & PRESTRESS CONCRETE STRUCTURES

1. Explain behavior of RCC members and Prestress concrete members.
2. Design interior panel of flat slab, Retaining walls.
3. Design Combine footing and canopy structure.
4. Analysis of Prestress concrete flexure member.
5. Design of Prestress concrete flexure member and Water Tank.
6. Design of RCC and Prestress concrete member.

6CE03: WATER RESOURCES ENGINEERING – I

1 Identify Various components of hydrologic cycle that affect the movement of water in the earth

2 Explain the Various Stream flow measurements technique

3 Apply the concepts of movement of ground water beneath the earth

4 Explain the basic requirements of irrigation and various irrigation techniques, requirements of the crops

5 Apply math, science, and technology in the field of water resource

6CE04: TRANSPORTATION ENGINEERING – II

1. Understanding the basics of Railway Engineerings . (L1:Understanding)
2. Explain Explain the construction aspects of railways and various defects in it. . (L2:Explain)
3. Design for turnout & cross over etc (L6 : Design)
4. Remembering the concept of Airport engineering (L1:Remembering)
5. Apply the knowledge in the construction of various components of airport engineering. (L3:Apply)
6. Explain the necessity and techniques used in tunnel engineering. (L2:Explain)

Semester - VII

7CE01: THEORY OF STRUCTURES II

1. Define Determinate, Indeterminate Structures and basic principals of structural analysis. (L1: Remembering)

2. Describe procedure of analysis of Determinate & Indeterminate Structures. (L2: Understanding)
3. Determine support reactions, shear forces, bending moments for given structure using engineering principles. Draw SFD BMD (L3: Applying)
4. Analyse the given structure (beam, frame) by using any method by considering sway effect (MDM, SDM, Kani's Method, MMSA) (L4: Analyzing)
5. Evaluate the given problem & Justify the method adopted for analysis. (L5: Evaluating)
6. Mini-project: Formulate 3D Model & Calculate the relative forces & deflection. (L6: Creating)

7CE02: GEOTECHNICAL ENGINEERING – II

1. List the methods of exploration, objectives and its field application along with data interpretation. (L1): Remember
2. Evaluate the bearing capacity of shallow and deep foundation. (L5): Evaluate
3. Find the earth pressure on foundations and retaining structures, understand various types of cofferdam. (L1): Remember
4. Understand the various ground improvement techniques. (L2): Understand
5. Design of pile foundation and evaluate soil settlement. (L6): Create
6. Evaluate the bearing capacity of shallow foundation, Determine the FSI of soil, Design of Pile foundation, Conduct the electrical resistivity and standard penetration test and Estimate the earth pressure acting on retaining wall. (L2): Understand

7CE03: DESIGN OF STEEL STRUCTURES

1. Explain the Design methods of design of steel structure.
2. Design bolted and welded connection.
3. Design the Tension and compression member.
4. Analysis of different loading on truss.
5. Design of steel flexure member.
6. Design of connection and structural member in steel structure.

7CE04: ENVIRONMENTAL ENGINEERING – I

1. Understand the water supply scheme and be able to eatimate the quantities and quality of water for municipal use
2. Explain the basic characteristics of water & its determination

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3. Understand the types of process used to treat for municipal purpose
4. Understand the fundamental engineering and science principal that are used to design and operate the processes used in treatment processes
5. Design of various treatment units plan & their operation

7CE05 PROF. ELECTIVE – I (vi) ADVANCED CONCRETE TECHNOLOGY

1. Explain necessity, applications, advantages, disadvantages of various construction chemicals and admixtures (L2: Understand)
2. Identify appropriate admixtures and construction chemicals for a given requirement. (L3: Apply)
3. Elaborate factors affecting durability of concrete and measures that can be adopted to improve durability of concrete for given environmental conditions. (L6: Create)
4. Justify use of Mineral Admixtures as a effective measure for minimizing environmental pollution (L5: Evaluate)
5. Explain need for repairs, interaction between permeability volume change and cracking, various repair materials and techniques available. (L2: Understand)
6. Discuss contribution of admixtures in reducing construction cost, faster completion of project and durability of concrete (L6: Create)

Semester - VIII

8CE01: WATER RESOURCES ENGINEERING – II

1. Decide suitable sites for construction of dam (L5:Evaluate)
2. Compare different types of dams,spillway and suggest suitable type of dam. (L4: Analyze)
3. Assessment of soil properties for construction of dams. (L5:Evaluate)
4. Apply the knowledge of instrumentation. (L3: Apply)
5. Make use of Model studies for dam spillway. (L3: Apply)

8CEO2: ENVIRONMENTAL ENGINEERING – II

1. Identify the Physical, chemical and biological characteristics of wastewater
2. Explain the analysis and selection of wastewater flowrates and constituent loadings for process design
3. Explain Physical unit operations: Screening, grit chamber, sedimentation and air flotation
4. Identify the plan strategies to control, reduce and monitor pollution
5. Explain Anaerobic treatment processes, sludge treatment and disposal: sources,

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characteristics and quantities of sludge. Treatment processes, gravity and flotation thickening, sludge digestion, vacuum and pressure filtration. Ultimate sludge disposal.

6. Apply and utilise practical knowkedge to determine BOD, COD,TVS,FS,SVI of wastewater sample

8CE03: PROJECT PLANNING & MANAGEMENT

1. Demonstrating of various types of projects moder construction techniques and Planning Tools: Basic concept of Gantt Chart, Bar Chart, Mile stone chart, and their advantage, limitations and overcoming measures. Conceptual Phase (L2)
2. Analyze Numerical on Time and Floats computation, concept of Updating Network and its numerical for computation. (L4)
3. Identify technique, three time estimates, average time, Critical path, slack computation, S.D, Variance, Probability factor, crash programme, normal and crash cost, normal and crash time, cost slope, Numerical on Probability computation, crashing . (L3)
4. Explain Concept of resource smoothening and leveling, Cost Curves, Numerical of it. Introduction to Planning softwares. (L5)
5. Analyze and modify by using MSP, ABC, EOQ Technique. (L4)
6. Explain details of Equipment Management (L5)

8CE04: PROFESSIONAL ELECTIVE – II (iv) DAM ENGINEERING

1. Decide suitable sites for construction of dam (L5:Evaluate)
2. Compare different types of dams,spillway and suggest suitable type of dam. (L4: Analyze)
3. Assessment of soil properties for construction of dams. (L5:Evaluate)
4. Apply the knowledge of instrumentation. (L3: Apply)
5. Make use of Model studies for dam spillway. (L3: Apply)

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PO, PSO & CO (Civil Engineering)

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Program Outcomes

PO1: Engineering Knowledge: Apply 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 specified needs with appropriate consideration for public health and safety, 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 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 modeling to complex engineering activities with an understanding of the limitations.

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

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

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

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary 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 effective reports and design documentation, make effective presentations and give and receive clear instructions

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PO11: Project Management and Finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

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 Specific Outcomes (PSO's)

PO13: Technical Solution for construction Industry: Able to think and find solutions for planning, analysis, safe and economical design and estimation of civil engineering structures and services.

PO14: Entrepreneurial and Management skills: Able to establish startup in the field of Structural Design, Estimating & costing, Surveying, Soil Engineering, Environmental Engineering and in Transportation Engineering etc, also can execute projects and provide a managerial solution to the construction Industry.

Course Outcomes

Semester –III

3CE01 MATHEMATICS III

1. Demonstrate the knowledge of differential equations and partial differential equations, applied to electrical engineering systems.
2. Apply Laplace transform to solve differential equations.
3. Demonstrate the use of Partial Differential Equations.
4. Compute different Numerical Methods.
5. Apply the knowledge of Complex Analysis.
6. Demonstrate the basic concepts of probability and statistics.

3CE02 STRENGTH OF MATERIALS

1. Explain mechanical properties of material, the concepts of stress and strain at a point and the stress-strain relationships, theory of simple bending, shear stresses & strain energy. (L2: Understand)
2. Calculate the stresses and strains in the members subjected to axial, bending and torsional loads and Shear & Bending Stresses. (L3: Apply)
3. Analyze the beam and draw axial force, shear force and bending moment, bending and shear stress distribution diagram for all types of loading. (L4:Analyze).
4. Solve problems using concept of theory of torsion & calculate the principal stresses and

strains in structural members.(L3: Apply)

5. Develop slope and deflection equations to find values of slope and deflection of beams subjected to loads.(L3: Apply)

6. Apply & utilize the theoratical & practical knowledge for performing shear, compression, modulus of rupture, hardness, deflection of spring & beam, Impact and Tension test on specimen. (L3: Apply)

3CE03 TRANSPORTATION ENGINEERING –I

1. Remembering the basics of transportation systems and various properties of materials used for road construction. (L1:Remembering)

2. Explain the construction aspects of roadways and their cross sectional elements of roads. (L2:Explain)

3. Design & analysis of flexible & rigid pavement, analysis for wheel lo (ad & temperature stresses in rigid pavement. (L6 : Design)

4. Understanding the concept of traffic engineering & traffic regulations for driving motor vehicles. (L2: Understanding)

5. Estimating flood discharge, water way, scour depth, depth of foundation, afflux, clearance and freeboard Also Understanding the components of bridge & different structural forms of culverts, causeway, bridges,etc. (L5: Estimate)

6. Determine properties of aggregates and bitumen. (L5:Determine)

3 CE04 BUILDING CONSTRUCTION & MATERIALS

1. Identify and characterize building materials (L3: Applying)
2. Understand the manufacturing process of bricks .(L6: Creating)
3. Identify the methods for preservation of timber .(L3: Applying)
4. Identify the factors to be considered in construction of buildings. (L3: Applying)
5. Understand the construction practices and techniques (L6: Creating)
6. Understand the techniques of damp proofing and fire resistance .(L2: Understanding)

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Semester – IV

4CE01: GEOTECIINICAL ENGINEERING – I

1. Explain the index and engineering properties of soil for its classification (L2): Understand
2. Elaborate the concept of soil compaction and quality control in feild. (L6): Create
3. Determine the permeability of soil and explain methods of dewatering. (L5): Evaluate
4. Determine the seepage discharge and design the graded filter. (L5): Evaluate
5. Understand the concept of consolidation and stress distribution in soil mass. (L2): Understand
6. Determine the Specific Gravity, Density, Atterrberg Limits, CBR, Shear Strength Parameters and Unconfied Compressive Strength of soil which helps in designing a structure. (L5): Evaluate

4CE02 FLUID MECHANICS – I

1. Apply their knowledge of basic fluid properties in fluid mechanics .(L4- Apply)
2. Solve problem in fluid statics and kinematics.(L6-Solve)
3. Solve problems in fluid dynamics and flow measurement.(L6-Solve)
4. Analysis the performance of flow instruments.(L4- Analysis,L6-Design)
5. Elaborate the knowledge in flow through pipes.(L6- Elaborate)
6. Discuss the drag and lift force. (L6- Discuss)

4CE03 : THEORY OF STRUCTURES – I

1. Students will be able to decide the method of analysis according to the type of structural element. (L5: Evaluating)
2. Students will be able to explain degree of freedom, Condition of equilibrium, Stiffness and determinacy of element. (L2: Understanding)
3. Students will be able to apply the knowledge of Castigliano's theorem for finding deflection in truss, beam & frame (L3: Applying)
4. Students will be able to apply the various analysis methods for analysis of structural member. (L4: Analyzing)
5. Students will be able to analyze the 3 hinged arches. (L4: Analyzing)

4CE04 SURVEYING –I

1. Identify to know the need surveying and Geo-informatics.
2. Decide and learn use of different instrument, tools for linear measurement

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3. Understand importance of different types of levels and its parts for measurment of elevations.

4. Determine bearing and angles by different tools, instrument.

5. Explain purpose of traversing by different method

6. Apply knowledge of theory to perform surveying on field

4CE05 REINFORCED CEMENT CONCRETE – I

1. Identify to know the need and composition of binding material , cement

2. Decide and utilise the admixture as per need of concrete

3. Understand importance of mix design

4. Analysis components of RCC like slab and beam

5. Explain need for repairs, interaction between permeability volume change and cracking, various repair materials and techniques available.

6. Apply knowledge of theory to perform different test on various material use in concrete technology

Semester - V

5CE01: REINFORCED CEMENT CONCRETE – IIII

1. Design the water tanks with rigid & flexible base using IS code.
2. Explain 1) LSM & WSM 2) Basic concept of singly reinforced beam & flange beam.
3. Solve the problem on Reinforced Concrete Columns and footings , beam.
4. Predict serviceability of structures
5. Interpret earthquake resistant construction.

5CE02: FLUID MECHANICS-II

1. Apply their knowledge of fluid mechanics in addressing in open channels.(L4- Apply)
2. Solve problem in uniform, gradually and rapidly varied flow in steady conditions.(L6-Solve)
3. Design construction as well as efficient working various type of hydraulic structure and machine is considerably simplified by using dimensional analysis and model study.(L6-Design)
4. Analysis and design the impact of jet on vanes which is a base of turbo machines.(L4-Analysis,L6-Design)
5. Elaborate the knowledge in hydraulic machines.(L6- Elaborate)

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6. Demonstrate the working of turbine and pumps. (L2- Demonstrate)

5CE03: BUILDING PLANNING AND CAD

1. Explain importance of building drawing for Civil Engineering in construction and industry. (L2: Understand)
2. Explain principals of planning and how climate effect on building planning. (L2: Understand)
3. Develop line plan of residential and commercial building. Calculate number of staircase, planning and drawing. (L3: Apply).
4. Apply & utilize the knowledge of building bye laws and principals of planning and develop working and submission drawing as per owner's requirements. (L3: Apply)

5CE04: SURVEYING-II

1 Demonstrate the application of tachometric surveying for calculating horizontal and vertical distances (L2)

2 Apply the knowledge of curve surveying for setting out curves. (L3)

3 Compare triangulation surveying with plain surveying (L5)

4 Elaborate the methods of hydrographic and underground surveying (L6)

5 Determine the geometric properties of object from photogrammetric image (L5)

6 Explain use of GIS and GPS (L2)

Semester- VI

6CE01: NUMERICAL METHODS AND COMPUTER PROGRAMMING

1. Explain spreadsheet and FORTRAN commands giving typical usage examples.(L2: Understand)
2. Develop flowcharts, programs and spreadsheets for performing basic mathematical operations encountered in civil engineer's day to day work life, applying knowledge of mathematics and programming logic.(L3: Apply, PO1, PO5)
3. Develop spreadsheets and programs for solving simple Civil Engineering tasks. (L3: Apply, PO1, PO5)
4. Develop own program for solving Civil Engineering problems using knowledge of Numerical Methods. (L6: Create, PO1,PO5)
5. Identify ways for simplifying program logic using various language features. (L4: Analyze, PO2, PO4, PO5)

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6. Propose ways to solve complex Civil Engineering Design and Automation problems using own programs, spreadsheets and commercial software.(L6: Create, PO4, PO5)

6CE02: DESIGN OF RCC & PRESTRESS CONCRETE STRUCTURES

1. Explain behavior of RCC members and Prestress concrete members.
2. Design interior panel of flat slab, Retaining walls.
3. Design Combine footing and canopy structure.
4. Analysis of Prestress concrete flexure member.
5. Design of Prestress concrete flexure member and Water Tank.
6. Design of RCC and Prestress concrete member.

6CE03: WATER RESOURCES ENGINEERING – I

1 Identify Various components of hydrologic cycle that affect the movement of water in the earth

2 Explain the Various Stream flow measurements technique

3 Apply the concepts of movement of ground water beneath the earth

4 Explain the basic requirements of irrigation and various irrigation techniques, requirements of the crops

5 Apply math, science, and technology in the field of water resource

6CE04: TRANSPORTATION ENGINEERING – II

1. Understanding the basics of Railway Engineerings . (L1:Understanding)
2. Explain Explain the construction aspects of railways and various defects in it. . (L2:Explain)
3. Design for turnout & cross over etc (L6 : Design)
4. Remembering the concept of Airport engineering (L1:Remembering)
5. Apply the knowledge in the construction of various components of airport engineering. (L3:Apply)
6. Explain the necessity and techniques used in tunnel engineering. (L2:Explain)

Semester - VII

7CE01: THEORY OF STRUCTURES II

1. Define Determinate, Indeterminate Structures and basic principals of structural analysis. (L1: Remembering)

2. Describe procedure of analysis of Determinate & Indeterminate Structures. (L2: Understanding)
3. Determine support reactions, shear forces, bending moments for given structure using engineering principles. Draw SFD BMD (L3: Applying)
4. Analyse the given structure (beam, frame) by using any method by considering sway effect (MDM, SDM, Kani's Method, MMSA) (L4: Analyzing)
5. Evaluate the given problem & Justify the method adopted for analysis. (L5: Evaluating)
6. Mini-project: Formulate 3D Model & Calculate the relative forces & deflection. (L6: Creating)

7CE02: GEOTECHNICAL ENGINEERING – II

1. List the methods of exploration, objectives and its field application along with data interpretation. (L1): Remember
2. Evaluate the bearing capacity of shallow and deep foundation. (L5): Evaluate
3. Find the earth pressure on foundations and retaining structures, understand various types of cofferdam. (L1): Remember
4. Understand the various ground improvement techniques. (L2): Understand
5. Design of pile foundation and evaluate soil settlement. (L6): Create
6. Evaluate the bearing capacity of shallow foundation, Determine the FSI of soil, Design of Pile foundation, Conduct the electrical resistivity and standard penetration test and Estimate the earth pressure acting on retaining wall. (L2): Understand

7CE03: DESIGN OF STEEL STRUCTURES

1. Explain the Design methods of design of steel structure.
2. Design bolted and welded connection.
3. Design the Tension and compression member.
4. Analysis of different loading on truss.
5. Design of steel flexure member.
6. Design of connection and structural member in steel structure.

7CE04: ENVIRONMENTAL ENGINEERING – I

1. Understand the water supply scheme and be able to eatimate the quantities and quality of water for municipal use
2. Explain the basic characteristics of water & its determination

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3. Understand the types of process used to treat for municipal purpose
4. Understand the fundamental engineering and science principal that are used to design and operate the processes used in treatment processes
5. Design of various treatment units plan & their operation

7CE05 PROF. ELECTIVE – I (vi) ADVANCED CONCRETE TECHNOLOGY

1. Explain necessity, applications, advantages, disadvantages of various construction chemicals and admixtures (L2: Understand)
2. Identify appropriate admixtures and construction chemicals for a given requirement. (L3: Apply)
3. Elaborate factors affecting durability of concrete and measures that can be adopted to improve durability of concrete for given environmental conditions. (L6: Create)
4. Justify use of Mineral Admixtures as a effective measure for minimizing environmental pollution (L5: Evaluate)
5. Explain need for repairs, interaction between permeability volume change and cracking, various repair materials and techniques available. (L2: Understand)
6. Discuss contribution of admixtures in reducing construction cost, faster completion of project and durability of concrete (L6: Create)

Semester - VIII

8CE01: WATER RESOURCES ENGINEERING – II

1. Decide suitable sites for construction of dam (L5:Evaluate)
2. Compare different types of dams,spillway and suggest suitable type of dam. (L4: Analyze)
3. Assessment of soil properties for construction of dams. (L5:Evaluate)
4. Apply the knowledge of instrumentation. (L3: Apply)
5. Make use of Model studies for dam spillway. (L3: Apply)

8CEO2: ENVIRONMENTAL ENGINEERING – II

1. Identify the Physical, chemical and biological characteristics of wastewater
2. Explain the analysis and selection of wastewater flowrates and constituent loadings for process design
3. Explain Physical unit operations: Screening, grit chamber, sedimentation and air flotation
4. Identify the plan strategies to control, reduce and monitor pollution
5. Explain Anaerobic treatment processes, sludge treatment and disposal: sources,

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characteristics and quantities of sludge. Treatment processes, gravity and flotation thickening, sludge digestion, vacuum and pressure filtration. Ultimate sludge disposal.

6. Apply and utilise practical knowkedge to determine BOD, COD,TVS,FS,SVI of wastewater sample

8CE03: PROJECT PLANNING & MANAGEMENT

1. Demonstrating of various types of projects moder construction techniques and Planning Tools: Basic concept of Gantt Chart, Bar Chart, Mile stone chart, and their advantage, limitations and overcoming measures. Conceptual Phase (L2)
2. Analyze Numerical on Time and Floats computation, concept of Updating Network and its numerical for computation. (L4)
3. Identify technique, three time estimates, average time, Critical path, slack computation, S.D, Variance, Probability factor, crash programme, normal and crash cost, normal and crash time, cost slope, Numerical on Probability computation, crashing . (L3)
4. Explain Concept of resource smoothening and leveling, Cost Curves, Numerical of it. Introduction to Planning softwares. (L5)
5. Analyze and modify by using MSP, ABC, EOQ Technique. (L4)
6. Explain details of Equipment Management (L5)

8CE04: PROFESSIONAL ELECTIVE – II (iv) DAM ENGINEERING

1. Decide suitable sites for construction of dam (L5:Evaluate)
2. Compare different types of dams,spillway and suggest suitable type of dam. (L4: Analyze)
3. Assessment of soil properties for construction of dams. (L5:Evaluate)
4. Apply the knowledge of instrumentation. (L3: Apply)
5. Make use of Model studies for dam spillway. (L3: Apply)

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AY 2019-20

Program Outcomes

PO1: Engineering Knowledge: Apply 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 specified needs with appropriate consideration for public health and safety, 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 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 modeling to complex engineering activities with an understanding of the limitations.

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

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

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

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary 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 effective reports and design documentation, make effective presentations and give and receive clear instructions

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PO11: Project Management and Finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

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 Specific Outcomes (PSO's)

PO13: Technical Solution for construction Industry: Able to think and find solutions for planning, analysis, safe and economical design and estimation of civil engineering structures and services.

PO14: Entrepreneurial and Management skills: Able to establish startup in the field of Structural Design, Estimating & costing, Surveying, Soil Engineering, Environmental Engineering and in Transportation Engineering etc, also can execute projects and provide a managerial solution to the construction Industry.

Course Outcomes

Semester –III

3CE01 MATHEMATICS III

1. Demonstrate the knowledge of differential equations and partial differential equations, applied to electrical engineering systems.
2. Apply Laplace transform to solve differential equations.
3. Demonstrate the use of Partial Differential Equations.
4. Compute different Numerical Methods.
5. Apply the knowledge of Complex Analysis.
6. Demonstrate the basic concepts of probability and statistics.

3CE02 STRENGTH OF MATERIALS

1. Explain mechanical properties of material, the concepts of stress and strain at a point and the stress-strain relationships, theory of simple bending, shear stresses & strain energy. (L2: Understand)
2. Calculate the stresses and strains in the members subjected to axial, bending and torsional loads and Shear & Bending Stresses. (L3: Apply)
3. Analyze the beam and draw axial force, shear force and bending moment, bending and shear stress distribution diagram for all types of loading. (L4:Analyze).
4. Solve problems using concept of theory of torsion & calculate the principal stresses and

strains in structural members.(L3: Apply)

5. Develop slope and deflection equations to find values of slope and deflection of beams subjected to loads.(L3: Apply)

6. Apply & utilize the theoratical & practical knowledge for performing shear, compression, modulus of rupture, hardness, deflection of spring & beam, Impact and Tension test on specimen. (L3: Apply)

3CE03 TRANSPORTATION ENGINEERING –I

1. Remembering the basics of transportation systems and various properties of materials used for road construction. (L1:Remembering)

2. Explain the construction aspects of roadways and their cross sectional elements of roads. (L2:Explain)

3. Design & analysis of flexible & rigid pavement, analysis for wheel lo (ad & temperature stresses in rigid pavement. (L6 : Design)

4. Understanding the concept of traffic engineering & traffic regulations for driving motor vehicles. (L2: Understanding)

5. Estimating flood discharge, water way, scour depth, depth of foundation, afflux, clearance and freeboard Also Understanding the components of bridge & different structural forms of culverts, causeway, bridges,etc. (L5: Estimate)

6. Determine properties of aggregates and bitumen. (L5:Determine)

3 CE04 BUILDING CONSTRUCTION & MATERIALS

1. Identify and characterize building materials (L3: Applying)
2. Understand the manufacturing process of bricks .(L6: Creating)
3. Identify the methods for preservation of timber .(L3: Applying)
4. Identify the factors to be considered in construction of buildings. (L3: Applying)
5. Understand the construction practices and techniques (L6: Creating)
6. Understand the techniques of damp proofing and fire resistance .(L2: Understanding)

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Semester – IV

4CE01: GEOTECIINICAL ENGINEERING – I

1. Explain the index and engineering properties of soil for its classification (L2): Understand
2. Elaborate the concept of soil compaction and quality control in feild. (L6): Create
3. Determine the permeability of soil and explain methods of dewatering. (L5): Evaluate
4. Determine the seepage discharge and design the graded filter. (L5): Evaluate
5. Understand the concept of consolidation and stress distribution in soil mass. (L2): Understand
6. Determine the Specific Gravity, Density, Atterrberg Limits, CBR, Shear Strength Parameters and Unconfied Compressive Strength of soil which helps in designing a structure. (L5): Evaluate

4CE02 FLUID MECHANICS – I

1. Apply their knowledge of basic fluid properties in fluid mechanics .(L4- Apply)
2. Solve problem in fluid statics and kinematics.(L6-Solve)
3. Solve problems in fluid dynamics and flow measurement.(L6-Solve)
4. Analysis the performance of flow instruments.(L4- Analysis,L6-Design)
5. Elaborate the knowledge in flow through pipes.(L6- Elaborate)
6. Discuss the drag and lift force. (L6- Discuss)

4CE03 : THEORY OF STRUCTURES – I

1. Students will be able to decide the method of analysis according to the type of structural element. (L5: Evaluating)
2. Students will be able to explain degree of freedom, Condition of equilibrium, Stiffness and determinacy of element. (L2: Understanding)
3. Students will be able to apply the knowledge of Castigliano's theorem for finding deflection in truss, beam & frame (L3: Applying)
4. Students will be able to apply the various analysis methods for analysis of structural member. (L4: Analyzing)
5. Students will be able to analyze the 3 hinged arches. (L4: Analyzing)

4CE04 SURVEYING –I

1. Identify to know the need surveying and Geo-informatics.
2. Decide and learn use of different instrument, tools for linear measurement

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3. Understand importance of different types of levels and its parts for measurment of elevations.

4. Determine bearing and angles by different tools, instrument.

5. Explain purpose of traversing by different method

6. Apply knowledge of theory to perform surveying on field

4CE05 REINFORCED CEMENT CONCRETE – I

1. Identify to know the need and composition of binding material , cement

2. Decide and utilise the admixture as per need of concrete

3. Understand importance of mix design

4. Analysis components of RCC like slab and beam

5. Explain need for repairs, interaction between permeability volume change and cracking, various repair materials and techniques available.

6. Apply knowledge of theory to perform different test on various material use in concrete technology

Semester - V

5CE01: REINFORCED CEMENT CONCRETE – IIII

1. Design the water tanks with rigid & flexible base using IS code.
2. Explain 1) LSM & WSM 2) Basic concept of singly reinforced beam & flange beam.
3. Solve the problem on Reinforced Concrete Columns and footings , beam.
4. Predict serviceability of structures
5. Interpret earthquake resistant construction.

5CE02: FLUID MECHANICS-II

1. Apply their knowledge of fluid mechanics in addressing in open channels.(L4- Apply)
2. Solve problem in uniform, gradually and rapidly varied flow in steady conditions.(L6-Solve)
3. Design construction as well as efficient working various type of hydraulic structure and machine is considerably simplified by using dimensional analysis and model study.(L6-Design)
4. Analysis and design the impact of jet on vanes which is a base of turbo machines.(L4-Analysis,L6-Design)
5. Elaborate the knowledge in hydraulic machines.(L6- Elaborate)

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6. Demonstrate the working of turbine and pumps. (L2- Demonstrate)

5CE03: BUILDING PLANNING AND CAD

1. Explain importance of building drawing for Civil Engineering in construction and industry. (L2: Understand)
2. Explain principals of planning and how climate effect on building planning. (L2: Understand)
3. Develop line plan of residential and commercial building. Calculate number of staircase, planning and drawing. (L3: Apply).
4. Apply & utilize the knowledge of building bye laws and principals of planning and develop working and submission drawing as per owner's requirements. (L3: Apply)

5CE04: SURVEYING-II

1 Demonstrate the application of tachometric surveying for calculating horizontal and vertical distances (L2)

2 Apply the knowledge of curve surveying for setting out curves. (L3)

3 Compare triangulation surveying with plain surveying (L5)

4 Elaborate the methods of hydrographic and underground surveying (L6)

5 Determine the geometric properties of object from photogrammetric image (L5)

6 Explain use of GIS and GPS (L2)

Semester- VI

6CE01: NUMERICAL METHODS AND COMPUTER PROGRAMMING

1. Explain spreadsheet and FORTRAN commands giving typical usage examples.(L2: Understand)
2. Develop flowcharts, programs and spreadsheets for performing basic mathematical operations encountered in civil engineer's day to day work life, applying knowledge of mathematics and programming logic.(L3: Apply, PO1, PO5)
3. Develop spreadsheets and programs for solving simple Civil Engineering tasks. (L3: Apply, PO1, PO5)
4. Develop own program for solving Civil Engineering problems using knowledge of Numerical Methods. (L6: Create, PO1,PO5)
5. Identify ways for simplifying program logic using various language features. (L4: Analyze, PO2, PO4, PO5)

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6. Propose ways to solve complex Civil Engineering Design and Automation problems using own programs, spreadsheets and commercial software.(L6: Create, PO4, PO5)

6CE02: DESIGN OF RCC & PRESTRESS CONCRETE STRUCTURES

1. Explain behavior of RCC members and Prestress concrete members.
2. Design interior panel of flat slab, Retaining walls.
3. Design Combine footing and canopy structure.
4. Analysis of Prestress concrete flexure member.
5. Design of Prestress concrete flexure member and Water Tank.
6. Design of RCC and Prestress concrete member.

6CE03: WATER RESOURCES ENGINEERING – I

1 Identify Various components of hydrologic cycle that affect the movement of water in the earth

2 Explain the Various Stream flow measurements technique

3 Apply the concepts of movement of ground water beneath the earth

4 Explain the basic requirements of irrigation and various irrigation techniques, requirements of the crops

5 Apply math, science, and technology in the field of water resource

6CE04: TRANSPORTATION ENGINEERING – II

1. Understanding the basics of Railway Engineerings . (L1:Understanding)
2. Explain Explain the construction aspects of railways and various defects in it. . (L2:Explain)
3. Design for turnout & cross over etc (L6 : Design)
4. Remembering the concept of Airport engineering (L1:Remembering)
5. Apply the knowledge in the construction of various components of airport engineering. (L3:Apply)
6. Explain the necessity and techniques used in tunnel engineering. (L2:Explain)

Semester - VII

7CE01: THEORY OF STRUCTURES II

1. Define Determinate, Indeterminate Structures and basic principals of structural analysis. (L1: Remembering)

2. Describe procedure of analysis of Determinate & Indeterminate Structures. (L2: Understanding)
3. Determine support reactions, shear forces, bending moments for given structure using engineering principles. Draw SFD BMD (L3: Applying)
4. Analyse the given structure (beam, frame) by using any method by considering sway effect (MDM, SDM, Kani's Method, MMSA) (L4: Analyzing)
5. Evaluate the given problem & Justify the method adopted for analysis. (L5: Evaluating)
6. Mini-project: Formulate 3D Model & Calculate the relative forces & deflection. (L6: Creating)

7CE02: GEOTECHNICAL ENGINEERING – II

1. List the methods of exploration, objectives and its field application along with data interpretation. (L1): Remember
2. Evaluate the bearing capacity of shallow and deep foundation. (L5): Evaluate
3. Find the earth pressure on foundations and retaining structures, understand various types of cofferdam. (L1): Remember
4. Understand the various ground improvement techniques. (L2): Understand
5. Design of pile foundation and evaluate soil settlement. (L6): Create
6. Evaluate the bearing capacity of shallow foundation, Determine the FSI of soil, Design of Pile foundation, Conduct the electrical resistivity and standard penetration test and Estimate the earth pressure acting on retaining wall. (L2): Understand

7CE03: DESIGN OF STEEL STRUCTURES

1. Explain the Design methods of design of steel structure.
2. Design bolted and welded connection.
3. Design the Tension and compression member.
4. Analysis of different loading on truss.
5. Design of steel flexure member.
6. Design of connection and structural member in steel structure.

7CE04: ENVIRONMENTAL ENGINEERING – I

1. Understand the water supply scheme and be able to eatimate the quantities and quality of water for municipal use
2. Explain the basic characteristics of water & its determination

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3. Understand the types of process used to treat for municipal purpose
4. Understand the fundamental engineering and science principal that are used to design and operate the processes used in treatment processes
5. Design of various treatment units plan & their operation

7CE05 PROF. ELECTIVE – I (vi) ADVANCED CONCRETE TECHNOLOGY

1. Explain necessity, applications, advantages, disadvantages of various construction chemicals and admixtures (L2: Understand)
2. Identify appropriate admixtures and construction chemicals for a given requirement. (L3: Apply)
3. Elaborate factors affecting durability of concrete and measures that can be adopted to improve durability of concrete for given environmental conditions. (L6: Create)
4. Justify use of Mineral Admixtures as a effective measure for minimizing environmental pollution (L5: Evaluate)
5. Explain need for repairs, interaction between permeability volume change and cracking, various repair materials and techniques available. (L2: Understand)
6. Discuss contribution of admixtures in reducing construction cost, faster completion of project and durability of concrete (L6: Create)

Semester - VIII

8CE01: WATER RESOURCES ENGINEERING – II

1. Decide suitable sites for construction of dam (L5:Evaluate)
2. Compare different types of dams,spillway and suggest suitable type of dam. (L4: Analyze)
3. Assessment of soil properties for construction of dams. (L5:Evaluate)
4. Apply the knowledge of instrumentation. (L3: Apply)
5. Make use of Model studies for dam spillway. (L3: Apply)

8CEO2: ENVIRONMENTAL ENGINEERING – II

1. Identify the Physical, chemical and biological characteristics of wastewater
2. Explain the analysis and selection of wastewater flowrates and constituent loadings for process design
3. Explain Physical unit operations: Screening, grit chamber, sedimentation and air flotation
4. Identify the plan strategies to control, reduce and monitor pollution
5. Explain Anaerobic treatment processes, sludge treatment and disposal: sources,

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characteristics and quantities of sludge. Treatment processes, gravity and flotation thickening, sludge digestion, vacuum and pressure filtration. Ultimate sludge disposal.

6. Apply and utilise practical knowkedge to determine BOD, COD,TVS,FS,SVI of wastewater sample

8CE03: PROJECT PLANNING & MANAGEMENT

1. Demonstrating of various types of projects moder construction techniques and Planning Tools: Basic concept of Gantt Chart, Bar Chart, Mile stone chart, and their advantage, limitations and overcoming measures. Conceptual Phase (L2)
2. Analyze Numerical on Time and Floats computation, concept of Updating Network and its numerical for computation. (L4)
3. Identify technique, three time estimates, average time, Critical path, slack computation, S.D, Variance, Probability factor, crash programme, normal and crash cost, normal and crash time, cost slope, Numerical on Probability computation, crashing . (L3)
4. Explain Concept of resource smoothening and leveling, Cost Curves, Numerical of it. Introduction to Planning softwares. (L5)
5. Analyze and modify by using MSP, ABC, EOQ Technique. (L4)
6. Explain details of Equipment Management (L5)

8CE04: PROFESSIONAL ELECTIVE – II (iv) DAM ENGINEERING

1. Decide suitable sites for construction of dam (L5:Evaluate)
2. Compare different types of dams,spillway and suggest suitable type of dam. (L4: Analyze)
3. Assessment of soil properties for construction of dams. (L5:Evaluate)
4. Apply the knowledge of instrumentation. (L3: Apply)
5. Make use of Model studies for dam spillway. (L3: Apply)

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AY 2020-21

Program Outcomes

PO1: Engineering Knowledge: Apply 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 specified needs with appropriate consideration for public health and safety, 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 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 modeling to complex engineering activities with an understanding of the limitations.

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

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

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

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary 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 effective reports and design documentation, make effective presentations and give and receive clear instructions

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PO11: Project Management and Finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

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 Specific Outcomes (PSO's)

PO13: Technical Solution for construction Industry: Able to think and find solutions for planning, analysis, safe and economical design and estimation of civil engineering structures and services.

PO14: Entrepreneurial and Management skills: Able to establish startup in the field of Structural Design, Estimating & costing, Surveying, Soil Engineering, Environmental Engineering and in Transportation Engineering etc, also can execute projects and provide a managerial solution to the construction Industry.

Course Outcomes

Semester –III

3CE01 MATHEMATICS III

1. Demonstrate the knowledge of differential equations and partial differential equations, applied to electrical engineering systems.
2. Apply Laplace transform to solve differential equations.
3. Demonstrate the use of Partial Differential Equations.
4. Compute different Numerical Methods.
5. Apply the knowledge of Complex Analysis.
6. Demonstrate the basic concepts of probability and statistics.

3CE02 STRENGTH OF MATERIALS

1. To understand the basics of material properties, stress and strain.
2. To apply knowledge of mathematics, science, for engineering applications
3. To identify, formulate, and solve engineering & real life problems

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4. To design and conduct experiments, as well as to analyze and interpret action and reaction data.

5. To understand specific requirement from the component to meet desired needs within realistic constraints of safety.

3CE03 BUILDING CONSTRUCTION & ENGINEERING GEOLOGY

1. To understand Load bearing and Frame structure.
2. To recognize various types of construction material and its suitability
3. To recognize the various levels in building and its need.
4. To know types of staircase, doors, windows and other related fixtures.
5. To recognize types of rock and minerals and its construction properties.
6. To know reason for earthquake and seismic waves.

3CE04 TRANSPORTATION ENGINEERING

1. To identify type of roads and its utility.
2. To understand the application of various road studies at time of survey and actual construction.
3. To design the various types of road pavements.
4. To understand rules regulations, signals , type of gauges and railway sleepers density.
5. To recognize the Airport features and design concept of components for Aero plains movement.
6. To identify types and components of Tunnels and bridges and its design components

3CE05 CONCRETE TECHNOLOGY & RCC

1. To know need and composition of binding material, cement.
2. To recognize concrete and RCC and will be able to perform desired test for suitability,
3. To analyze RCC Components like slab and lintels.
4. To decide and utilize the admixtures as per the need of Concrete.
5. To understand importance of mix design.

Semester - IV

4CE01 BUILDING PLANNING DESIGNING & CAD

1. To make engineering drawings by First angle and Third angle method.
2. To apple building planning principles practically while developing projects.
3. To study the climatic conditions and decide the corresponding provision in structure.
4. To know about Bylaws, Town development authority rules and terms.
5. To draw various plans manually and computationally.

4CE02 - HYDROLOGY & WATER RESOURCE ENGINEERING

1. Explain the hydrology and hydrological data.
2. To analyze the hydrological methods for runoff.
3. Evaluate the ground water hydrological problems.
4. Explain the need of irrigation systems and its alternatives

4CE03 SURVEYING

1. Define principles of Surveying, Remote Sensing and Geomatics.
2. Describe different instruments, tools, applications and techniques to determine the positions on the surface of
the earth, change detection.
3. To perform Liner measurement methods of surveying.
4. Differentiate the techniques for setting out alignments, curves, other layouts, modern survey systems etc.
5. To perform survey at elevation and conduct Plane Table survey.

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4CE04 - GEOTECHNICAL ENGINEERING

1. To determine the Index properties and Atterberg limits for soil classification.
2. To understand the mechanics of compaction and quality control in field.
3. To explain permeability of soil and methods of dewatering.
4. To calculate the seepage discharge and design the graded filter.
5. To understand the concept of consolidation and stress distribution in soil mass.

To calculate the shear strength of different soil.

4CE05 - STRUCTURAL ANALYSIS- I

1. To decide what is required to be analyzed depending upon type of structural element.
2. To know about degree of freedom, Condition of equilibrium and determinacy of element.
3. To understand reason for failure and permissible limits for safety.
4. To apply the knowledge of beam analysis for practical analysis and design purpose.
5. To make application of various analysis methods for actual structural member analysis and design.
6. To know merits for utilization of suspension, 2 hinged and 3 hinged arches.

1.

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Semester - V

5CE01: REINFORCED CEMENT CONCRETE – IIII

1. Design the water tanks with rigid & flexible base using IS code.
2. Explain 1) LSM & WSM 2) Basic concept of singly reinforced beam & flange beam.
3. Solve the problem on Reinforced Concrete Columns and footings , beam.
4. Predict serviceability of structures
5. Interpret earthquake resistant construction.

5CE02: FLUID MECHANICS-II

1. Apply their knowledge of fluid mechanics in addressing in open channels.(L4- Apply)
2. Solve problem in uniform,gradually and rapidly varied flow in steady conditions.(L6-Solve)
3. Design construction as well as efficient working various type of hydraulic structure and machine is considerably simplified by using dimensional analysis and model study.(L6-Design)
4. Analysis and design the impact of jet on vanes which is a base of turbo machines.(L4-Analysis,L6-Design)
5. Elaborate the knowledge in hydraulic machines.(L6- Elaborate)
6. Demonstrate the working of turbine and pumps. (L2- Demonstrate)

5CE03: BUILDING PLANNING AND CAD

1. Explain importance of building drawing for Civil Engineering in construction and industry. (L2: Understand)
2. Explain principals of planning and how climate effect on building planning. (L2: Understand)
3. Develop line plan of residential and commercial building. Calculate number of staircase, planning and drawing. (L3: Apply).
4. Apply & utilize the knowledge of building bye laws and principals of planning and develop working and submission drawing as per owner's requirements. (L3: Apply)

5CE04: SURVEYING-II

1 Demonstrate the application of tachometric surveying for calculating horizontal and vertical

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distances (L2)

2 Apply the knowledge of curve surveying for setting out curves. (L3)

3 Compare triangulation surveying with plain surveying (L5)

4 Elaborate the methods of hydrographic and underground surveying (L6)

5 Determine the geometric properties of object from photogrammetric image (L5)

6 Explain use of GIS and GPS (L2)

Semester- VI

6CE01: NUMERICAL METHODS AND COMPUTER PROGRAMMING

1. Explain spreadsheet and FORTRAN commands giving typical usage examples.(L2: Understand)
2. Develop flowcharts, programs and spreadsheets for performing basic mathematical operations encountered in civil engineer's day to day work life, applying knowledge of mathematics and programming logic.(L3: Apply, PO1, PO5)
3. Develop spreadsheets and programs for solving simple Civil Engineering tasks. (L3: Apply, PO1, PO5)
4. Develop own program for solving Civil Engineering problems using knowledge of Numerical Methods. (L6: Create, PO1,PO5)
5. Identify ways for simplifying program logic using various language features. (L4: Analyze, PO2, PO4, PO5)
6. Propose ways to solve complex Civil Engineering Design and Automation problems using own programs, spreadsheets and commercial software.(L6: Create, PO4, PO5)

6CE02: DESIGN OF RCC & PRESTRESS CONCRETE STRUCTURES

1. Explain behavior of RCC members and Prestress concrete members.
2. Design interior panel of flat slab, Retaining walls.
3. Design Combine footing and canopy structure.
4. Analysis of Prestress concrete flexure member.
5. Design of Prestress concrete flexure member and Water Tank.
6. Design of RCC and Prestress concrete member.

6CE03: WATER RESOURCES ENGINEERING – I

1 Identify Various components of hydrologic cycle that affect the movement of water in the

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earth

2 Explain the Various Stream flow measurements technique

3 Apply the concepts of movement of ground water beneath the earth

4 Explain the basic requirements of irrigation and various irrigation techniques, requirements of the crops

5 Apply math, science, and technology in the field of water resource

6CE04: TRANSPORTATION ENGINEERING – II

1. Understanding the basics of Railway Engineerings . (L1:Understanding)
2. Explain Explain the construction aspects of railways and various defects in it. . (L2:Explain)
3. Design for turnout & cross over etc (L6 : Design)
4. Remembering the concept of Airport engineering (L1:Remembering)
5. Apply the knowledge in the construction of various components of airport engineering. (L3:Apply)
6. Explain the necessity and techniques used in tunnel engineering. (L2:Explain)

Semester - VII

7CE01: THEORY OF STRUCTURES II

1. Define Determinate, Indeterminate Structures and basic principals of structural analysis. (L1: Remembering)
2. Describe procedure of analysis of Determinate & Indeterminate Structures. (L2: Understanding)
3. Determine support reactions, shear forces, bending moments for given structure using engineering principles. Draw SFD BMD (L3: Applying)
4. Analyse the given structure (beam, frame) by using any method by considering sway effect (MDM, SDM, Kani's Method, MMSA) (L4: Analyzing)
5. Evaluate the given problem & Justify the method adopted for analysis. (L5: Evaluating)
6. Mini-project: Formulate 3D Model & Calculate the relative forces & deflection. (L6: Creating)

7CE02: GEOTECHNICAL ENGINEERING – II

1. List the methods of exploration, objectives and its field application along with data interpretation. (L1): Remember
2. Evaluate the bearing capacity of shallow and deep foundation. (L5): Evaluate

3. Find the earth pressure on foundations and retaining structures, understand various types of cofferdam. (L1): Remember
4. Understand the various ground improvement techniques. (L2): Understand
5. Design of pile foundation and evaluate soil settlement. (L6): Create
6. Evaluate the bearing capacity of shallow foundation, Determine the FSI of soil, Design of Pile foundation, Conduct the electrical resistivity and standard penetration test and Estimate the earth pressure acting on retaining wall. (L2): Understand

7CE03: DESIGN OF STEEL STRUCTURES

1. Explain the Design methods of design of steel structure.
2. Design bolted and welded connection.
3. Design the Tension and compression member.
4. Analysis of different loading on truss.
5. Design of steel flexure member.
6. Design of connection and structural member in steel structure.

7CE04: ENVIRONMENTAL ENGINEERING – I

1. Understand the water supply scheme and be able to eatimate the quantities and quality of water for municipal use
2. Explain the basic characteristics of water & its determination
3. Understand the types of process used to treat for municipal purpose
4. Understand the fundamental engineering and science principal that are used to design and operate the processes used in treatment processes
5. Design of various treatment units plan & their operation

7CE05 PROF. ELECTIVE – I (vi) ADVANCED CONCRETE TECHNOLOGY

1. Explain necessity, applications, advantages, disadvantages of various construction chemicals and admixtures (L2: Understand)
2. Identify appropriate admixtures and construction chemicals for a given requirement. (L3: Apply)
3. Elaborate factors affecting durability of concrete and measures that can be adopted to improve durability of concrete for given environmental conditions. (L6: Create)
4. Justify use of Mineral Admixtures as a effective measure for minimizing environmental pollution (L5: Evaluate)

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5. Explain need for repairs, interaction between permeability volume change and cracking, various repair materials and techniques available. (L2: Understand)
6. Discuss contribution of admixtures in reducing construction cost, faster completion of project and durability of concrete (L6: Create)

Semester - VIII

8CE01: WATER RESOURCES ENGINEERING – II

1. Decide suitable sites for construction of dam (L5:Evaluate)
2. Compare different types of dams,spillway and suggest suitable type of dam. (L4: Analyze)
3. Assessment of soil properties for construction of dams. (L5:Evaluate)
4. Apply the knowledge of instrumentation. (L3: Apply)
5. Make use of Model studies for dam spillway. (L3: Apply)

8CEO2: ENVIRONMENTAL ENGINEERING – II

1. Identify the Physical, chemical and biological characteristics of wastewater
2. Explain the analysis and selection of wastewater flowrates and constituent loadings for process design
3. Explain Physical unit operations: Screening, grit chamber, sedimentation and air flotation
4. Identify the plan strategies to control, reduce and monitor pollution
5. Explain Anaerobic treatment processes, sludge treatment and disposal: sources, characteristics and quantities of sludge. Treatment processes, gravity and flotation thickening, sludge digestion, vacuum and pressure filtration. Ultimate sludge disposal.
6. Apply and utilise practical knowkedge to determine BOD, COD,TVS,FS,SVI of wastewater sample

8CE03: PROJECT PLANNING & MANAGEMENT

1. Demonstrating of various types of projects moder construction techniques and Planning Tools: Basic concept of Gantt Chart, Bar Chart, Mile stone chart, and their advantage, limitations and overcoming measures. Conceptual Phase (L2)
2. Analyze Numerical on Time and Floats computation, concept of Updating Network and its numerical for computation. (L4)
3. Identify technique, three time estimates, average time, Critical path, slack computation, S.D, Variance, Probability factor, crash programme, normal and crash cost, normal and crash time, cost slope, Numerical on Probability computation, crashing . (L3)

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4. Explain Concept of resource smoothening and leveling, Cost Curves, Numerical of it. Introduction to Planning softwares. (L5)
5. Analyze and modify by using MSP, ABC, EOQ Technique. (L4)
6. Explain details of Equipment Management (L5)

8CE04: PROFESSIONAL ELECTIVE – II (iv) DAM ENGINEERING

1. Decide suitable sites for construction of dam (L5:Evaluate)
2. Compare different types of dams,spillway and suggest suitable type of dam. (L4: Analyze)
3. Assessment of soil properties for construction of dams. (L5:Evaluate)
4. Apply the knowledge of instrumentation. (L3: Apply)
5. Make use of Model studies for dam spillway. (L3: Apply)

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AY 2021-22

Program Outcomes

PO1: Engineering Knowledge: Apply 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 specified needs with appropriate consideration for public health and safety, 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 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 modeling to complex engineering activities with an understanding of the limitations.

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

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

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

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary 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 effective reports and design documentation, make effective presentations and give and receive clear instructions.

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PO11: Project Management and Finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

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 Specific Outcomes (PSO's)

PO13: Technical Solution for construction Industry: Able to think and find solutions for planning, analysis, safe and economical design and estimation of civil engineering structures and services.

PO14: Entrepreneurial and Management skills: Able to establish startup in the field of Structural Design, Estimating & costing, Surveying, Soil Engineering, Environmental Engineering and in Transportation Engineering etc, also can execute projects and provide a managerial solution to the construction Industry.

Program Educational Objectives

PEO 1: Preparation: To strive for overall personality development of students so as to nurture not only quintessential technocrats but also responsible citizens.

PEO 2: Core Competence: To make the students apply the necessary problem-solving,design, and application skills for successful careers in Civil Engineering.

PEO 3: Breadth: To provide the educational foundation and communication skills that prepare the students for diverse career paths

PEO 4: Professionalism: To inculcate the value systems & ethics, leadership and team work skills, bring holistic development of personality and to promote entrepreneurial thinking amongstudents.

PEO 5: Learning environment: To provide students with an environment that develops confidence and stimulates innovative thinking for successful professional career.

Course Outcomes

3CE01 MATHEMATICS III

1. Demonstrate the knowledge of differential equations and partial differential equations, applied to electrical

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engineering systems.

2. Apply Laplace transform to solve differential equations.

3. Demonstrate the use of Partial Differential Equations.

4. Compute different Numerical Methods.

5. Apply the knowledge of Complex Analysis.

6. Demonstrate the basic concepts of probability and statistics.

3CE02 STRENGTH OF MATERIALS

1. To understand the basics of material properties, stress and strain.

2. To apply knowledge of mathematics, science, for engineering applications

3. To identify, formulate, and solve engineering & real life problems

4. To design and conduct experiments, as well as to analyze and interpret action and reaction data.

5. To understand specific requirement from the component to meet desired needs within realistic constraints of safety.

3CE03 BUILDING CONSTRUCTION & ENGINEERING GEOLOGY

1. To understand Load bearing and Frame structure.

2. To recognize various types of construction material and its suitability

3. To recognize the various levels in building and its need.

4. To know types of staircase, doors, windows and other related fixtures.

5. To recognize types of rock and minerals and its construction properties.

6. To know reason for earthquake and seismic waves.

3CE04 TRANSPORTATION ENGINEERING

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1. To identify type of roads and its utility.

2. To understand the application of various road studies at time of survey and actual construction.

3. To design the various types of road pavements.

4. To understand rules regulations, signals , type of gauges and railway sleepers density.

5. To recognize the Airport features and design concept of components for Aero plains movement.

6. To identify types and components of Tunnels and bridges and its design components.

3CE05 CONCRETE TECHNOLOGY & RCC

1. To know need and composition of binding material, cement.

2. To recognize concrete and RCC and will be able to perform desired test for suitability,

3. To analyze RCC Components like slab and lintels.

4. To decide and utilize the admixtures as per the need of Concrete.

5. To understand importance of mix design.

Forth Semester

4CE01 BUILDING PLANNING DESIGNING & CAD

1. To make engineering drawings by First angle and Third angle method.

2. To apple building planning principles practically while developing projects.

3. To study the climatic conditions and decide the corresponding provision in structure.

4. To know about Bylaws, Town development authority rules and terms.

5. To draw various plans manually and computationally.

4CE02 - HYDROLOGY & WATER RESOURCE ENGINEERING

1. Explain the hydrology and hydrological data.

2. To analyze the hydrological methods for runoff.

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3. Evaluate the ground water hydrological problems.

4. Explain the need of irrigation systems and its alternatives

4CE03 SURVEYING

1. Define principles of Surveying, Remote Sensing and Geomatics.

2. Describe different instruments, tools, applications and techniques to determine the positions on the surface of

the earth, change detection.

3. To perform Liner measurement methods of surveying.

4. Differentiate the techniques for setting out alignments, curves, other layouts, modern survey systems etc.

5. To perform survey at elevation and conduct Plane Table survey.

4CE04 - GEOTECHNICAL ENGINEERING

1. To determine the Index properties and Atterberg limits for soil classification.

2. To understand the mechanics of compaction and quality control in field.

3. To explain permeability of soil and methods of dewatering.

4. To calculate the seepage discharge and design the graded filter.

5. To understand the concept of consolidation and stress distribution in soil mass.

To calculate the shear strength of different soil.

4CE05 - STRUCTURAL ANALYSIS- I

1. To decide what is required to be analyzed depending upon type of structural element.

2. To know about degree of freedom, Condition of equilibrium and determinacy of element.

3. To understand reason for failure and permissible limits for safety.

4. To apply the knowledge of beam analysis for practical analysis and design purpose.

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5. To make application of various analysis methods for actual structural member analysis and design.

6. To know merits for utilization of suspension, 2 hinged and 3 hinged arches.

V Semester

5CE01: Design of Reinforced &Prestressed Concrete Structures

1. To analyze and design of rectangular section.
2. To analyze and design of slab.
3. To analyze and design of staircase and retaining wall.
4. To analyze and design of column and footing.
5. To understand grid slab and ductile detailing.
6. Explain the general behavior of PC sections under external load.

5CE02: Surveying & Geomatics

1. Understand the use of different types of curves and their field implications.
2. Understand the triangulation adjustment.
3. Understand the hydrographic survey.
4. Acquire skills in handling spatial data base warehousing and mining.
5. Understand the surveying with advance instrument like remote sensing, GPS and GIS.

5CE03: Numerical Methods and Computer Programming

1. To use spreadsheet software for solving civil engineering problems.
2. To impart knowledge to analyze, solve, design and code numerical method problems using C language.
3. To impart knowledge to analyze, solve, design and code civil engineering problems using C language.

(Professional Elective I)

5CE04: (I) Highway Construction and Management

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Course Outcomes:
At the end of the subject the students will be able –

1. Explain the basic concepts about highway engineering
2. To design geometric elements of the highway.
3. To design the various types of road pavements with construction and maintenance of highway.
4. To carry out traffic studies and implement traffic regulation and control measures and intersection design.
5. To apply the knowledge to prevent the road accidents.

5CE04: (ii) Repairs & Rehabilitation Of Structures

Course Outcomes:
By the end of this course students will have the capability/knowledge of

1. Various distress and damages to concrete and masonry structures
2. The importance of maintenance of structures, types and properties of repair materials etc
3. Assessing damage to structures and various repair techniques

(Open Elective)
5CE05: (i) Basics of Building Construction

Course Outcomes:
At the end of the subject the students will be able -

1. To understand Load bearing and Frame structure with their foundations.
2. To recognize various types of construction material and its suitability
3. To recognize the various levels in building and its need.
4. To know types of openings, doors, windows and other related fixtures.
5. To recognize types of rock and minerals and its construction properties.
6. To understand the basic concepts of DPC, fireproof, soundproof and expansion joints in structure.

5CE05: (ii) Disaster Management

Course Outcomes:
At the end of the subject the students will be able -

1. To understand concept and terms related to Disaster.
2. To understand various types of Natural and Artificial Disaster.
3. To decide and take actions to mitigate impact of disaster.

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4. To know roles and responsibility of organizations – public and private, individual and group to manage disaster.

Sixth Semester
6CE01: Design of Steel Structure

Course Outcomes:

At the end of the subject the students will be able -

1. To explain the methods of design of steel structure.
2. To design bolted and welded connection.
3. To identify the different failure modes of bolted and welded connections, and determine their design strengths.
4. To design the Tension and compression member.
5. To identify and compute the design loads on a typical steel roof truss.
6. To design basic elements of steel structure like beams, column and bases.

6CE02: Environmental Engineering – I

Course Outcomes: -

1. Define and explain the significance of terms and parameters frequently used in water supply engineering.
2. Evaluate the influence of the different parameter in design and treatment of water treatment plant (water quality parameters).
3. Basic methodology for water treatment (viz., sedimentation, coagulation, flocculation, filtration, disinfection and water softening.)
4. An understanding of water quality criteria and standards, and their relation to public health.

6CE03: Fluid Mechanics

Course Outcome:

Student shall be able to

1. Describe basic properties of fluid flow.
2. Apply the knowledge to fluid flow problems.
3. Analyze the type of flow by using basic of mathematical principle.
4. Solve and modelling the pipe flow problems.

(Open Elective II)
6CE05: (I) Environmental Management

Course Outcomes:

At the end of the course the student will:

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1. Be aware of different environmental problems, their causes and effects.
2. Have knowledge regarding different environmental policies & management plans.
3. Have thorough knowledge about Environmental Legislation and Acts.
4. Acquire information about various agencies for Environmental Managements in India.
5. Have knowledge regarding different systems working for Environmental Management.

6CE05: (iii) Introduction to Earthquake Engineering

Course Outcomes:
At the end of the subject the students will be able to -

1. Identify type of earthquake, its properties
2. Earthquake resistance planning
3. Apply knowledge of seismic bands in masonry structure construction
4. Solve engineering problems in the context of Earthquake Engineering.

Seventh Semester

7CE01: THEORY OF STRUCTURES II

1. Define Determinate, Indeterminate Structures and basic principals of structural analysis. (L1: Remembering)
2. Describe procedure of analysis of Determinate & Indeterminate Structures. (L2: Understanding)
3. Determine support reactions, shear forces, bending moments for given structure using engineering principles. Draw SFD BMD (L3: Applying)
4. Analyse the given structure (beam, frame) by using any method by considering sway effect (MDM, SDM, Kani's Method, MMSA) (L4: Analyzing)
5. Evaluate the given problem & Justify the method adopted for analysis. (L5: Evaluating)
6. Mini-project: Formulate 3D Model & Calculate the relative forces & deflection. (L6: Creating)

7CE02: GEOTECHNICAL ENGINEERING – II

1. List the methods of exploration, objectives and its field application along with data interpretation. (L1): Remember
2. Evaluate the bearing capacity of shallow and deep foundation. (L5): Evaluate
3. Find the earth pressure on foundations and retaining structures, understand various types of cofferdam. (L1): Remember
4. Understand the various ground improvement techniques. (L2): Understand

5. Design of pile foundation and evaluate soil settlement. (L6): Create
6. Evaluate the bearing capacity of shallow foundation, Determine the FSI of soil, Design of Pile foundation, Conduct the electrical resistivity and standard penetration test and Estimate the earth pressure acting on retaining wall. (L2): Understand

7CE03: DESIGN OF STEEL STRUCTURES

1. Explain the Design methods of design of steel structure.
2. Design bolted and welded connection.
3. Design the Tension and compression member.
4. Analysis of different loading on truss.
5. Design of steel flexure member.
6. Design of connection and structural member in steel structure.

7CE04: ENVIRONMENTAL ENGINEERING – I

1. Understand the water supply scheme and be able to eatimate the quantities and quality of water for municipal use
2. Explain the basic characteristics of water & its determination
3. Understand the types of process used to treat for municipal purpose
4. Understand the fundamental engineering and science principal that are used to design and operate the processes used in treatment processes
5. Design of various treatment units plan & their operation

7CE05 PROF. ELECTIVE – I (vi) ADVANCED CONCRETE TECHNOLOGY

1. Explain necessity, applications, advantages, disadvantages of various construction chemicals and admixtures (L2: Understand)
2. Identify appropriate admixtures and construction chemicals for a given requirement. (L3: Apply)
3. Elaborate factors affecting durability of concrete and measures that can be adopted to improve durability of concrete for given environmental conditions. (L6: Create)
4. Justify use of Mineral Admixtures as a effective measure for minimizing environmental pollution (L5: Evaluate)
5. Explain need for repairs, interaction between permeability volume change and cracking, various repair materials and techniques available. (L2: Understand)
6. Discuss contribution of admixtures in reducing construction cost, faster completion of

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project and durability of concrete (L6: Create)

Eighth Semester

8CE01: WATER RESOURCES ENGINEERING – II

1. Decide suitable sites for construction of dam (L5:Evaluate)
2. Compare different types of dams,spillway and suggest suitable type of dam. (L4: Analyze)
3. Assessment of soil properties for construction of dams. (L5:Evaluate)
4. Apply the knowledge of instrumentation. (L3: Apply)
5. Make use of Model studies for dam spillway. (L3: Apply)

8CEO2: ENVIRONMENTAL ENGINEERING – II

1. Identify the Physical, chemical and biological characteristics of wastewater
2. Explain the analysis and selection of wastewater flowrates and constituent loadings for process design
3. Explain Physical unit operations: Screening, grit chamber, sedimentation and air flotation
4. Identify the plan strategies to control, reduce and monitor pollution
5. Explain Anaerobic treatment processes, sludge treatment and disposal: sources, characteristics and quantities of sludge. Treatment processes, gravity and flotation thickening, sludge digestion, vacuum and pressure filtration. Ultimate sludge disposal.
6. Apply and utilise practical knowkedge to determine BOD, COD,TVS,FS,SVI of wastewater sample

8CE03: PROJECT PLANNING & MANAGEMENT

1. Demonstrating of various types of projects moder construction techniques and Planning Tools: Basic concept of Gantt Chart, Bar Chart, Mile stone chart, and their advantage, limitations and overcoming measures. Conceptual Phase (L2)
2. Analyze Numerical on Time and Floats computation, concept of Updating Network and its numerical for computation. (L4)
3. Identify technique, three time estimates, average time, Critical path, slack computation, S.D, Variance, Probability factor, crash programme, normal and crash cost, normal and crash time, cost slope, Numerical on Probability computation, crashing . (L3)
4. Explain Concept of resource smoothening and leveling, Cost Curves, Numerical of it. Introduction to Planning softwares. (L5)
5. Analyze and modify by using MSP, ABC, EOQ Technique. (L4)

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6. Explain details of Equipment Management (L5)

8CE04: PROFESSIONAL ELECTIVE – II (iv) DAM ENGINEERING

1. Decide suitable sites for construction of dam (L5:Evaluate)
2. Compare different types of dams,spillway and suggest suitable type of dam. (L4: Analyze)
3. Assessment of soil properties for construction of dams. (L5:Evaluate)
4. Apply the knowledge of instrumentation. (L3: Apply)
5. Make use of Model studies for dam spillway. (L3: Apply)

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UG-CSE

Department of Computer Science & Engineering

Academic Year- 2017-18

Program educational objective (PEO's)

PE01. Preparation: To prepare students for successful careers in software industry that meet the needs of Indian and multinational companies or to excel in Higher studies.

PEO2. Core competence: To develop the ability among students to synthesize data and technical concepts for software design and development.

PEO3. Breadth: To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach and an ability to relate engineering issues to broader social context.

PEO4. Professionalism: To provide students with a sound foundation in the mathematical, scientific and computer engineering fundamentals required to solve engineering problems and also pursue higher studies.

PEO5. Learning Environment: To promote student with an academic environment aware of excellence, leadership, written ethical codes and guidelines and the life-long learning needed for a successful professional career.

- **Program Outcomes (PO's) Engineering Graduate will be able to:**

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, review research literature, and analyse 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 modeling 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.

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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 effective reports and design documentation, make effective presentations, and 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 Specific Outcomes (PSO's)

PSO1: Foundation of Computer System Development: Ability to use knowledge of computer systems and design principles in building the hardware and software components / products in the domain of embedded system, artificial intelligence, databases, networking, web technology and mobile computing.
PSO2: Problem Solving Ability: Ability to apply knowledge in various problem domains and implement innovative / suitable solutions to cater to needs of industry, business and e-governance by imbibing highest ethical and economical values.

- **Course Outcomes-CO's**

Semester-3rd

Sr. No	Subject Name	Subject Code	CO's
1	MATHEMATICS – II	3KS01	1. Apply the knowledge to solve differential equation by different method. 2. Solve Laplace Transform by making use of its properties and evaluate differential equation by Laplace transform. 3. Solve the Difference equation and Apply z-transform on Discrete function. 4. Solve partial differential equation of first order and 5. Determine Fourier Sine and Cosine transform of function. 6. Determine analytic function, Taylor and Laurent's series. Apply the knowledge of vector calculus to solve physical problem.
2	PROGRAMMING METHODOLOGY	3KS02	1. Demonstrate how to configure a simple Java development environment and fundamentals of java definition constructs. 2. Explain the basic building blocks of object-oriented programming. 3. Describe the Java SDK environment to create, debug and run the simple Java programs. 4. Focus on a software development problem and express its essence sufficiently and

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			precisely. 5. Describe and discuss the event handling and AWT components.
3	ELECTRONIC DEVICES AND CIRCUITS	3KS03	1. Explain basic electronics devices and its application. 2. Describe the structure of BJT and compare its configuration. 3. Analyze different biasing and compensation technique. 4. Examine the performance of FETs on the basic of their types and working. 5. Demonstrate operations and explain working of different types of oscillators. 6. Interpret the operation on different optoelectronic devices.
4	DISCRETE STRUCTURE	3KS04	1. Identify basic terminology of Mathematical Logic. 2. Explain theory of inference and predicate calculus. 3. Identify, illustrate, and solve engineering problems on the basis of set theory. 4. Identify and Design an Algebraic Structures and groups. 5. Examine and formulate the concept of Lattices & Boolean Algebra to solve engineering problems. 6. Design and interpret data using graphs, trees and related algorithms.
5	COMPUTER ORGANIZATION	3KS05	1. State the basics of computer hardware and how software interacts with computer hardware. 2. Explain fundamental concept of processing unit and identify the techniques for control unit design. 3. Illustrate the concept of processing I/O organization and examine different ways of communicating with I/O devices and standard I/O interfaces. 4. Design memory organization that uses banks for different word size operation and also show how cache design parameters affect cache hit rate. 5. Perform computer arithmetic operations and assess the efficiency of arithmetic operation. 6. Describe Input-Output and communication devices

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Semester-4th

Sr. No	Subject Name	Subject Code	CO's
1	DATA STRUCTURES	4KS01	1. Understand the of basic data structures for storage and retrieval of linear and nonlinear data structure. 2. Apply knowledge of data structures to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure. 3. Differentiate between arrays & linked list which is used to implement list of abstract data types. 4. Understand the tradeoffs between stacks and queues which can make appropriate design decisions based on application data requirements. 5. Design and develop the data structures such as tree by using C as the programming language using static or dynamic implementations. 6. Recognize the importance of Graph and its application in real world scenarios.
2	ANALOG & DIGITAL ICS	4KS02	1. Understand the basic concepts of operational amplifier and its various applications. 2. Explain the operation and application of IC555 and IC565. 3. Compare different Number System and basics of conversion of number System. 4. Realize different minimization technique to obtain minimized expression. 5. Design Combinational Circuits. 6. Design and develop Sequential Digital Circuits.
3	OBJECT ORIENTED PROGRAMMING	4KS03	1. To illustrate the basic concept of objects & Classes, Constructors, Arrays of object++ String class. 2. To explain the concept of operator overloading, Data Conversion, Pointers & Arrays. 3. To demonstrate the use of Inheritance & containership in C++. 4. To implement the concept of Abstract Classes & Virtual functions. 5. To outline the concept of streams and file handling in C++. 6. To demonstrate the use of Function templates, Class Templates & Exception Handling.
4	ASSEMBLY	4KS04	1. Describe how a CPU performs instructions

	LANGUAGE PROGRAMMING		during the fetch-decode-execute cycle and how the memory supports its actions and also able to edit, compile. execute, and debug an assembler program. 2. Explain how standard arithmetic operations (+... and /) are performed by the hardware and explain the uses of various machine addressing modes and why they are used. Perform Read, write, and debug programs in assembly language. 3. Describe the operation of various logic gates and the theory (Boolean algebra) behind them. Implement conditional and looping structures within an assembler program and create and use assembly subroutines. 4. Explain the internal workings of the machine on a procedure call and describe the structure of the call frame. Distinguish between situations in which procedurals or macros are appropriate. 5. Determine the pin configuration of IC's. Determine the internal organization of memory and also able to identify the address decoding techniques. 6. Identify the types of interrupts with their priority and able to explain the interrupt controller IC.
5	THEORY OF COMPUTATION	4KS05	1. To construct finite state machines to solve problems in computing. 2. To write regular expressions for the formal languages. 3. To construct and apply well defined rules for parsing techniques in compiler. 4. To construct and analyze Push Down, Turing Machine for formal languages. 5. To express the understanding of the Chomsky Hierarchy. 6. To express the understanding of the decidability and un-decidability problems.

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Semester-5th

Sr. No	Subject Name	Subject Code	CO's
1	DATA COMMUNICATION	5KS01	1. Design and Test different encoding and modulating techniques to change digital – to- digital conversion, analog-to-digital conversion, digital to analog conversion, analog to analog conversion. 2. Explain the various multiplexing methods and evaluate the different error detection & correction techniques. 3. Understand and realize the data link control and data link protocols. 4. Describe and demonstrate the various Local area networks and the IEEE standards. 5. Describe and Explain data communication system using the characteristics specified and Conclude co-relation of theory concept with practices.
2	FILE STRUCTURE & DATA PROCESSING	5KS02	1. Describe operating system concepts and process. 2. Implement concept of CPU scheduling and deadlock. 3. Implement memory management techniques. 4. Explain file system and free space management. 5. Describe I/O system and disk scheduling. 6. Implement operating system concept with reference to linux system.
3	SYSTEM SOFTWARE	5KS03	1. Identify the fundamentals of compiler and its phases. 2. Understand the concept of syntax analysis and solve the problems of predictive parsing. 3. Design and differentiate top down and bottom-up parsing techniques. 4. Apply syntax directed translation to construct syntax trees. 5. Relate various storage allocation strategies of compiler. 6. Evaluate intermediate code and target code from the source code.
4	SWITCHING THEORY & LOGIC DESIGN	5KS04	1. Explain fundamental of VHDL Programming. 2. Differentiate architectural styles of VHDL constructs. 3. Demonstrate different methods to obtain minimized expression. 4. Understand basic Combinational Circuits.

			5. Design Combinational circuits. 6. Construct Sequential digital circuits.
5	COMMUNICATION SKILLS	5KS05	1. Course outcomes number one state the importance of study of communication skills for engineering. 2. Master the required skills listening reading writing and speaking for being a working professional; Writing effective proposals, report etc. 3. Identify Strategies for improving communication in social and professional relationships. 4. Identify and apply Strategies for effective communication using Technology.

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Semester-6th

Sr. No	Subject Name	Subject Code	CO's
1	OPERATING SYSTEM	6KS01	1. Describe operating system concepts and process. 2. Implement concept of CPU scheduling and deadlock. 3. Implement memory management techniques. 4. Explain file system and free space management. 5. Describe 10 system and disk scheduling. 6. Implement operating system concept with reference to lines systems.
2	DATABASE SYSTEM	6KS02	1. Explain database system is built and its advantages over file system. 2. Describe basic constructs and terminology of database systems with different Keys and how it is useful for efficient access of data. 3. Demonstrate SQL i.e. basic programming language with proper syntax to store, retrieve and operate o data. 4. Design proper database model which should well-mannered with specific normal form. 5. Apply serialization on schedules and dealing with various types of Serializability with brief knowledge of Query processing. 6. Apply concurrency control of transactions with deadlock handling.
3	COMPUTING RESOURCE MANAGEMENT	6KS03	1. Understand and perform the key steps in the development of a strategic business plan for new or existing companies. 2. To Evaluate company's performance including financials, market share, innovation, and employment. 3. To Develop a suitable budget for a new project. 4. To Identify important risks facing a new project. 5. Understand the integration of technical, financial, human resources and legal aspects of public and private enterprises. 6. Understand the administration, ownership, and organization of natural resources management enterprises.
4	COMPUTER ARCHITECTURE	6KS04	1. To familiarize the basic concepts and structure of computers. 2. To Understand concepts of arithmetic

			operations. 3. To help students in understanding of addressing modes and memory organization. 4. To understand Conceptualize multitasking ability of a computer and pipelining 5. To facilitate students in learning IO communication
5	PROFESSIONAL ETHICS	6KS06	1. The goal of this course is to define the concept of ethics and its relationship to morality and the law. Student will be capable of identifying moral and immoral issues related to the ethics. 2. To identify excuses and justifications for conducting unethical business practices. Students will be able evaluate real ethics violations and determine outcomes through a detailed case study. Also, they will be able to evaluate real ethics violations and determine outcomes through a detailed case study. 3. To demonstrate and understanding of the legal, ethical, and social responsibilities of business toward their members, their customer, and the natural environment. Demonstrate the ability to recognize and solve contemporary ethical and social issues in the business, economics or public administration decision making process.

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Semester-7th

Sr. No	Subject Name	Subject Code	CO's
1	DIGITAL SIGNAL PROCESSING	7KS01	1. Differentiate between analog, continuous time, discrete time, and digital signals with the basic operations involved in signal conversion. 2. Perform calculations to convolve, to correlate finite sequences and able to analyze whether the system is stable or not. 3. Apply Z transform properties and theorems to find the response of digital system. 4. Examine the Discrete time Fourier transform using DIT-FFT and DIF-FFT algorithms. 5. Design IIR, FIR filter by using Direct I, Direct II, cascade, Parallel forms of filter. 6. Compare and contrast the digital low pass and high pass FIR & IIR filters to satisfy given frequencies and attenuation factors.
2	COMPUTER NETWORK	7KS02	1. Describe operating system concepts and process. 2. Implement concept of CPU scheduling and deadlock. 3. Implement memory management techniques. 4. Explain file system and free space management. 5. Describe LO system and disk scheduling. 6. Implement operating system concept with reference to linux system.
3	DESIGN AND ANALYSIS OF ALGORITHM	7KS03	1. Understand and compare different algorithms for calculating time and space complexity using asymptotic notations. 2. Comprehend and analyze the divide-and-conquer strategy for design and analysis of various algorithms. 3. Understand and apply greedy method to various algorithms in order to compute optimal solution and devise asymptotic notation. 4. Interpret and analyze dynamic programming approach for designing graph and matrix-based algorithms. 5. Design and analyze concept of backtracking for search and traversal algorithms. 6. Apply the knowledge gained to infer the efficiency of algorithms considering time and space trade off.

4	OBJECT ORIENTED ANALYSIS & DESIGN	7KS04	1. To define and explain object-oriented modeling concept and class modeling. 2. To distinguish advanced class modeling and advance state modeling with its characteristics. To discuss interaction modeling and advanced interaction modeling. 3. To analyze and design the process overview, system conception and domain analysis. 4. To explain object-oriented methodology for software development in the problem domain using types of application analysis and system design. 5. To illustrate class design concept and shows how to select analysis model and provide a basis for implementation. 6. Customization and exploration of Rational Rose Software and Unified Modeling Language. Also con struct the different UML diagrams like Class diagram, Component Diagram, Use Case Diagram, Object Diagram, Sequence Diagram, Activity Diagram, State Diagram, Deployment diagram. Collaboration Diagram
5	WEB ENGINEERING	7KS05	1. To discuss web architecture, its principles and review the protocol suites. 2. To apply the knowledge of HTML and CSS to create personal and business websites using current professional and industrial standard. 3. Design and Develop data transfer scripts using XML language for the transfer of data over the Internet. 4. To formulate maximum flexibility for XML documents validation with XML Schema over DTD. 5. To create an interactive session in Java script, between user and the server using objects and functions. 6. To summarize relation between the user and server generated from the web server through automated response with the help of CGI.

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Semester-8th

Sr. No	Subject Name	Subject Code	CO's
1	ARTIFICIAL INTELLIGENCE	8KS01	1. Identify appropriate problem specification and explore various AI techniques to understand problem characteristics. 2. Familiar with terminology used in this topical area such as draw problem tree and graph to represent knowledge. Interpret various weak methods. 3. Explain game playing using minmax search procedure and illustrate alpha-beta cut-offs using additional refinement. 4. Express Knowledge Representation and convert to clause form, and apply Resolution in prepositional and predicate logic. 5. Compare various structural Representation of knowledge finding the right structure as needed. Demonstrate using semantic nets, conceptual dependency, frames and Scripts. 6. Explore Natural Language understanding by analyzing syntax and semantics to develop understanding single and multiple sentences.
2	EMBEDDED SYSTEM	8KS02	1. Describe the basics of embedded systems and structural core units as well as memory organization for embedded system. 2. Explain components of embedded system, characteristics and quality attributes of embedded systems. 3. Discuss role of 8051 microcontroller and its architecture in design of embedded systems 4. Examine the different Addressing modes and Instruction Set of 8051 microcontrollers. 5. Use knowledge of C programming to do embedded programming. 6. Assess the Real-Time Operating System concepts with VxWorks RTOS.
3	SOFTWARE ENGINEERING	8KS03	1. To define software engineering and explain its importance. 2. To study the concepts of software products and software processes. 3. To explain the importance of process visibility. 4. To introduce the notion of professional responsibility. 5. Software engineering is a process of

			developing software using engineering principles. Some advantages include predefined, consistent solutions to common problems and standardized methods of implementation, reengineering and testing serves as a guide to a maturing engineering discipline. 6. Software engineering is the establishment and use of sound engineering principles in Order to obtain economically software that is reliable and works efficiently on real machines. 7. Software Engineering: (1) The application of a systematic, disciplined, quantifiable approach. 8. To develop the operation, and maintenance of software.
4	NETWORK SECURITY	8KS04	1. To understand the linear and nonlinear data Structures and its memory representations. 2. To perform different operations on data structures such as insertion, deletion, searching and traversing. 3. To understand various data searching and sorting methods with its complexity. 4. To introduce various techniques for representation of the data in the real world.

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Academic Year- 2018-19

Program educational objective (PEO's)

PE01. Preparation: To prepare students for successful careers in software industry that meet the needs of Indian and multinational companies or to excel in Higher studies.

PEO2. Core competence: To develop the ability among students to synthesize data and technical concepts for software design and development.

PEO3. Breadth: To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach and an ability to relate engineering issues to broader social context.

PEO4. Professionalism: To provide students with a sound foundation in the mathematical, scientific and computer engineering fundamentals required to solve engineering problems and also pursue higher studies.

PEO5. Learning Environment: To promote student with an academic environment aware of excellence, leadership, written ethical codes and guidelines and the life-long learning needed for a successful professional career.

- **Program Outcomes (PO's) Engineering Graduate will be able to:**

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, review research literature, and analyse 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 modeling 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.

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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 effective reports and design documentation, make effective presentations, and 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 Specific Outcomes (PSO's)

PSO1: Foundation of Computer System Development: Ability to use knowledge of computer systems and design principles in building the hardware and software components / products in the domain of embedded system, artificial intelligence, databases, networking, web technology and mobile computing.
PSO2: Problem Solving Ability: Ability to apply knowledge in various problem domains and implement innovative / suitable solutions to cater to needs of industry, business and e-governance by imbibing highest ethical and economical values.

- **Course Outcomes-CO's**

Semester-3rd

Sr. No	Subject Name	Subject Code	CO's
1	MATHEMATICS – II	3KS01	1. Apply the knowledge to solve differential equation by different method. 2. Solve Laplace Transform by making use of its properties and evaluate differential equation by Laplace transform. 3. Solve the Difference equation and Apply z-transform on Discrete function. 4. Solve partial differential equation of first order and 5. Determine Fourier Sine and Cosine transform of function. 6. Determine analytic function, Taylor and Laurent's series. Apply the knowledge of vector calculus to solve physical problem.
2	PROGRAMMING METHODOLOGY	3KS02	1. Demonstrate how to configure a simple Java development environment and fundamentals of java definition constructs. 2. Explain the basic building blocks of object-oriented programming. 3. Describe the Java SDK environment to create, debug and run the simple Java programs. 4. Focus on a software development problem and express its essence sufficiently and

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			precisely. 5. Describe and discuss the event handling and AWT components.
3	ELECTRONIC DEVICES AND CIRCUITS	3KS03	1. Explain basic electronics devices and its application. 2. Describe the structure of BJT and compare its configuration. 3. Analyze different biasing and compensation technique. 4. Examine the performance of FETs on the basic of their types and working. 5. Demonstrate operations and explain working of different types of oscillators. 6. Interpret the operation on different optoelectronic devices.
4	DISCRETE STRUCTURE	3KS04	1. Identify basic terminology of Mathematical Logic. 2. Explain theory of inference and predicate calculus. 3. Identify, illustrate, and solve engineering problems on the basis of set theory. 4. Identify and Design an Algebraic Structures and groups. 5. Examine and formulate the concept of Lattices & Boolean Algebra to solve engineering problems. 6. Design and interpret data using graphs, trees and related algorithms.
5	COMPUTER ORGANIZATION	3KS05	1. State the basics of computer hardware and how software interacts with computer hardware. 2. Explain fundamental concept of processing unit and identify the techniques for control unit design. 3. Illustrate the concept of processing I/O organization and examine different ways of communicating with I/O devices and standard I/O interfaces. 4. Design memory organization that uses banks for different word size operation and also show how cache design parameters affect cache hit rate. 5. Perform computer arithmetic operations and assess the efficiency of arithmetic operation. 6. Describe Input-Output and communication devices

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Semester-4th

Sr. No	Subject Name	Subject Code	CO's
1	DATA STRUCTURES	4KS01	1. Understand the of basic data structures for storage and retrieval of linear and nonlinear data structure. 2. Apply knowledge of data structures to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure. 3. Differentiate between arrays & linked list which is used to implement list of abstract data types. 4. Understand the tradeoffs between stacks and queues which can make appropriate design decisions based on application data requirements. 5. Design and develop the data structures such as tree by using C as the programming language using static or dynamic implementations. 6. Recognize the importance of Graph and its application in real world scenarios.
2	ANALOG & DIGITAL ICS	4KS02	1. Understand the basic concepts of operational amplifier and its various applications. 2. Explain the operation and application of IC555 and IC565. 3. Compare different Number System and basics of conversion of number System. 4. Realize different minimization technique to obtain minimized expression. 5. Design Combinational Circuits. 6. Design and develop Sequential Digital Circuits.
3	OBJECT ORIENTED PROGRAMMING	4KS03	1. To illustrate the basic concept of objects & Classes, Constructors, Arrays of object++ String class. 2. To explain the concept of operator overloading, Data Conversion, Pointers & Arrays. 3. To demonstrate the use of Inheritance & containership in C++. 4. To implement the concept of Abstract Classes & Virtual functions. 5. To outline the concept of streams and file handling in C++. 6. To demonstrate the use of Function templates, Class Templates & Exception Handling.
4	ASSEMBLY	4KS04	1. Describe how a CPU performs instructions

	LANGUAGE PROGRAMMING		during the fetch-decode-execute cycle and how the memory supports its actions and also able to edit, compile. execute, and debug an assembler program. 2. Explain how standard arithmetic operations (+... and /) are performed by the hardware and explain the uses of various machine addressing modes and why they are used. Perform Read, write, and debug programs in assembly language. 3. Describe the operation of various logic gates and the theory (Boolean algebra) behind them. Implement conditional and looping structures within an assembler program and create and use assembly subroutines. 4. Explain the internal workings of the machine on a procedure call and describe the structure of the call frame. Distinguish between situations in which procedurals or macros are appropriate. 5. Determine the pin configuration of IC's. Determine the internal organization of memory and also able to identify the address decoding techniques. 6. Identify the types of interrupts with their priority and able to explain the interrupt controller IC.
5	THEORY OF COMPUTATION	4KS05	1. To construct finite state machines to solve problems in computing. 2. To write regular expressions for the formal languages. 3. To construct and apply well defined rules for parsing techniques in compiler. 4. To construct and analyze Push Down, Turing Machine for formal languages. 5. To express the understanding of the Chomsky Hierarchy. 6. To express the understanding of the decidability and un-decidability problems.

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Semester-5th

Sr. No	Subject Name	Subject Code	CO's
1	DATA COMMUNICATION	5KS01	1. Design and Test different encoding and modulating techniques to change digital – to- digital conversion, analog-to-digital conversion, digital to analog conversion, analog to analog conversion. 2. Explain the various multiplexing methods and evaluate the different error detection & correction techniques. 3. Understand and realize the data link control and data link protocols. 4. Describe and demonstrate the various Local area networks and the IEEE standards. 5. Describe and Explain data communication system using the characteristics specified and Conclude co-relation of theory concept with practices.
2	FILE STRUCTURE & DATA PROCESSING	5KS02	1. Describe operating system concepts and process. 2. Implement concept of CPU scheduling and deadlock. 3. Implement memory management techniques. 4. Explain file system and free space management. 5. Describe I/O system and disk scheduling. 6. Implement operating system concept with reference to linux system.
3	SYSTEM SOFTWARE	5KS03	1. Identify the fundamentals of compiler and its phases. 2. Understand the concept of syntax analysis and solve the problems of predictive parsing. 3. Design and differentiate top down and bottom-up parsing techniques. 4. Apply syntax directed translation to construct syntax trees. 5. Relate various storage allocation strategies of compiler. 6. Evaluate intermediate code and target code from the source code.
4	SWITCHING THEORY & LOGIC DESIGN	5KS04	1. Explain fundamental of VHDL Programming. 2. Differentiate architectural styles of VHDL constructs. 3. Demonstrate different methods to obtain minimized expression. 4. Understand basic Combinational Circuits.

			5. Design Combinational circuits. 6. Construct Sequential digital circuits.
5	COMMUNICATION SKILLS	5KS05	1. Course outcomes number one state the importance of study of communication skills for engineering. 2. Master the required skills listening reading writing and speaking for being a working professional; Writing effective proposals, report etc. 3. Identify Strategies for improving communication in social and professional relationships. 4. Identify and apply Strategies for effective communication using Technology.

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Semester-6th

Sr. No	Subject Name	Subject Code	CO's
1	OPERATING SYSTEM	6KS01	1. Describe operating system concepts and process. 2. Implement concept of CPU scheduling and deadlock. 3. Implement memory management techniques. 4. Explain file system and free space management. 5. Describe 10 system and disk scheduling. 6. Implement operating system concept with reference to lines systems.
2	DATABASE SYSTEM	6KS02	1. Explain database system is built and its advantages over file system. 2. Describe basic constructs and terminology of database systems with different Keys and how it is useful for efficient access of data. 3. Demonstrate SQL i.e. basic programming language with proper syntax to store, retrieve and operate o data. 4. Design proper database model which should well-mannered with specific normal form. 5. Apply serialization on schedules and dealing with various types of Serializability with brief knowledge of Query processing. 6. Apply concurrency control of transactions with deadlock handling.
3	COMPUTING RESOURCE MANAGEMENT	6KS03	1. Understand and perform the key steps in the development of a strategic business plan for new or existing companies. 2. To Evaluate company's performance including financials, market share, innovation, and employment. 3. To Develop a suitable budget for a new project. 4. To Identify important risks facing a new project. 5. Understand the integration of technical, financial, human resources and legal aspects of public and private enterprises. 6. Understand the administration, ownership, and organization of natural resources management enterprises.
4	COMPUTER ARCHITECTURE	6KS04	1. To familiarize the basic concepts and structure of computers. 2. To Understand concepts of arithmetic

			operations. 3. To help students in understanding of addressing modes and memory organization. 4. To understand Conceptualize multitasking ability of a computer and pipelining 5. To facilitate students in learning IO communication
5	PROFESSIONAL ETHICS	6KS06	1. The goal of this course is to define the concept of ethics and its relationship to morality and the law. Student will be capable of identifying moral and immoral issues related to the ethics. 2. To identify excuses and justifications for conducting unethical business practices. Students will be able evaluate real ethics violations and determine outcomes through a detailed case study. Also, they will be able to evaluate real ethics violations and determine outcomes through a detailed case study. 3. To demonstrate and understanding of the legal, ethical, and social responsibilities of business toward their members, their customer, and the natural environment. Demonstrate the ability to recognize and solve contemporary ethical and social issues in the business, economics or public administration decision making process.

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Semester-7th

Sr. No	Subject Name	Subject Code	CO's
1	DIGITAL SIGNAL PROCESSING	7KS01	1. Differentiate between analog, continuous time, discrete time, and digital signals with the basic operations involved in signal conversion. 2. Perform calculations to convolve, to correlate finite sequences and able to analyze whether the system is stable or not. 3. Apply Z transform properties and theorems to find the response of digital system. 4. Examine the Discrete time Fourier transform using DIT-FFT and DIF-FFT algorithms. 5. Design IIR, FIR filter by using Direct I, Direct II, cascade, Parallel forms of filter. 6. Compare and contrast the digital low pass and high pass FIR & IIR filters to satisfy given frequencies and attenuation factors.
2	COMPUTER NETWORK	7KS02	1. Describe operating system concepts and process. 2. Implement concept of CPU scheduling and deadlock. 3. Implement memory management techniques. 4. Explain file system and free space management. 5. Describe LO system and disk scheduling. 6. Implement operating system concept with reference to linux system.
3	DESIGN AND ANALYSIS OF ALGORITHM	7KS03	1. Understand and compare different algorithms for calculating time and space complexity using asymptotic notations. 2. Comprehend and analyze the divide-and-conquer strategy for design and analysis of various algorithms. 3. Understand and apply greedy method to various algorithms in order to compute optimal solution and devise asymptotic notation. 4. Interpret and analyze dynamic programming approach for designing graph and matrix-based algorithms. 5. Design and analyze concept of backtracking for search and traversal algorithms. 6. Apply the knowledge gained to infer the efficiency of algorithms considering time and space trade off.

4	OBJECT ORIENTED ANALYSIS & DESIGN	7KS04	1. To define and explain object-oriented modeling concept and class modeling. 2. To distinguish advanced class modeling and advance state modeling with its characteristics. To discuss interaction modeling and advanced interaction modeling. 3. To analyze and design the process overview, system conception and domain analysis. 4. To explain object-oriented methodology for software development in the problem domain using types of application analysis and system design. 5. To illustrate class design concept and shows how to select analysis model and provide a basis for implementation. 6. Customization and exploration of Rational Rose Software and Unified Modeling Language. Also con struct the different UML diagrams like Class diagram, Component Diagram, Use Case Diagram, Object Diagram, Sequence Diagram, Activity Diagram, State Diagram, Deployment diagram. Collaboration Diagram
5	WEB ENGINEERING	7KS05	1. To discuss web architecture, its principles and review the protocol suites. 2. To apply the knowledge of HTML and CSS to create personal and business websites using current professional and industrial standard. 3. Design and Develop data transfer scripts using XML language for the transfer of data over the Internet. 4. To formulate maximum flexibility for XML documents validation with XML Schema over DTD. 5. To create an interactive session in Java script, between user and the server using objects and functions. 6. To summarize relation between the user and server generated from the web server through automated response with the help of CGI.

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Semester-8th

Sr. No	Subject Name	Subject Code	CO's
1	ARTIFICIAL INTELLIGENCE	8KS01	1. Identify appropriate problem specification and explore various AI techniques to understand problem characteristics. 2. Familiar with terminology used in this topical area such as draw problem tree and graph to represent knowledge. Interpret various weak methods. 3. Explain game playing using minmax search procedure and illustrate alpha-beta cut-offs using additional refinement. 4. Express Knowledge Representation and convert to clause form, and apply Resolution in prepositional and predicate logic. 5. Compare various structural Representation of knowledge finding the right structure as needed. Demonstrate using semantic nets, conceptual dependency, frames and Scripts. 6. Explore Natural Language understanding by analyzing syntax and semantics to develop understanding single and multiple sentences.
2	EMBEDDED SYSTEM	8KS02	1. Describe the basics of embedded systems and structural core units as well as memory organization for embedded system. 2. Explain components of embedded system, characteristics and quality attributes of embedded systems. 3. Discuss role of 8051 microcontroller and its architecture in design of embedded systems 4. Examine the different Addressing modes and Instruction Set of 8051 microcontrollers. 5. Use knowledge of C programming to do embedded programming. 6. Assess the Real-Time Operating System concepts with VxWorks RTOS.
3	SOFTWARE ENGINEERING	8KS03	1. To define software engineering and explain its importance. 2. To study the concepts of software products and software processes. 3. To explain the importance of process visibility. 4. To introduce the notion of professional responsibility. 5. Software engineering is a process of

			developing software using engineering principles. Some advantages include predefined, consistent solutions to common problems and standardized methods of implementation, reengineering and testing serves as a guide to a maturing engineering discipline. 6. Software engineering is the establishment and use of sound engineering principles in Order to obtain economically software that is reliable and works efficiently on real machines. 7. Software Engineering: (1) The application of a systematic, disciplined, quantifiable approach. 8. To develop the operation, and maintenance of software.
4	NETWORK SECURITY	8KS04	1. To understand the linear and nonlinear data Structures and its memory representations. 2. To perform different operations on data structures such as insertion, deletion, searching and traversing. 3. To understand various data searching and sorting methods with its complexity. 4. To introduce various techniques for representation of the data in the real world.

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Academic Year- 2019-20

Program educational objective (PEO's)

PE01. Preparation: To prepare students for successful careers in software industry that meet the needs of Indian and multinational companies or to excel in Higher studies.

PEO2. Core competence: To develop the ability among students to synthesize data and technical concepts for software design and development.

PEO3. Breadth: To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach and an ability to relate engineering issues to broader social context.

PEO4. Professionalism: To provide students with a sound foundation in the mathematical, scientific and computer engineering fundamentals required to solve engineering problems and also pursue higher studies.

PEO5. Learning Environment: To promote student with an academic environment aware of excellence, leadership, written ethical codes and guidelines and the life-long learning needed for a successful professional career.

- **Program Outcomes (PO's) Engineering Graduate will be able to:**

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, review research literature, and analyse 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 modeling 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.

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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 effective reports and design documentation, make effective presentations, and 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 Specific Outcomes (PSO's)

PSO1: Foundation of Computer System Development: Ability to use knowledge of computer systems and design principles in building the hardware and software components / products in the domain of embedded system, artificial intelligence, databases, networking, web technology and mobile computing.
PSO2: Problem Solving Ability: Ability to apply knowledge in various problem domains and implement innovative / suitable solutions to cater to needs of industry, business and e-governance by imbibing highest ethical and economical values.

- **Course Outcomes-CO's**

Semester-3rd

Sr. No	Subject Name	Subject Code	CO's
1	MATHEMATICS – II	3KS01	1. Apply the knowledge to solve differential equation by different method. 2. Solve Laplace Transform by making use of its properties and evaluate differential equation by Laplace transform. 3. Solve the Difference equation and Apply z-transform on Discrete function. 4. Solve partial differential equation of first order and 5. Determine Fourier Sine and Cosine transform of function. 6. Determine analytic function, Taylor and Laurent's series. Apply the knowledge of vector calculus to solve physical problem.
2	PROGRAMMING METHODOLOGY	3KS02	1. Demonstrate how to configure a simple Java development environment and fundamentals of java definition constructs. 2. Explain the basic building blocks of object-oriented programming. 3. Describe the Java SDK environment to create, debug and run the simple Java programs. 4. Focus on a software development problem and express its essence sufficiently and

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			precisely. 5. Describe and discuss the event handling and AWT components.
3	ELECTRONIC DEVICES AND CIRCUITS	3KS03	1. Explain basic electronics devices and its application. 2. Describe the structure of BJT and compare its configuration. 3. Analyze different biasing and compensation technique. 4. Examine the performance of FETs on the basic of their types and working. 5. Demonstrate operations and explain working of different types of oscillators. 6. Interpret the operation on different optoelectronic devices.
4	DISCRETE STRUCTURE	3KS04	1. Identify basic terminology of Mathematical Logic. 2. Explain theory of inference and predicate calculus. 3. Identify, illustrate, and solve engineering problems on the basis of set theory. 4. Identify and Design an Algebraic Structures and groups. 5. Examine and formulate the concept of Lattices & Boolean Algebra to solve engineering problems. 6. Design and interpret data using graphs, trees and related algorithms.
5	COMPUTER ORGANIZATION	3KS05	1. State the basics of computer hardware and how software interacts with computer hardware. 2. Explain fundamental concept of processing unit and identify the techniques for control unit design. 3. Illustrate the concept of processing I/O organization and examine different ways of communicating with I/O devices and standard I/O interfaces. 4. Design memory organization that uses banks for different word size operation and also show how cache design parameters affect cache hit rate. 5. Perform computer arithmetic operations and assess the efficiency of arithmetic operation. 6. Describe Input-Output and communication devices

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Semester-4th

Sr. No	Subject Name	Subject Code	CO's
1	DATA STRUCTURES	4KS01	1. Understand the of basic data structures for storage and retrieval of linear and nonlinear data structure. 2. Apply knowledge of data structures to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure. 3. Differentiate between arrays & linked list which is used to implement list of abstract data types. 4. Understand the tradeoffs between stacks and queues which can make appropriate design decisions based on application data requirements. 5. Design and develop the data structures such as tree by using C as the programming language using static or dynamic implementations. 6. Recognize the importance of Graph and its application in real world scenarios.
2	ANALOG & DIGITAL ICS	4KS02	1. Understand the basic concepts of operational amplifier and its various applications. 2. Explain the operation and application of IC555 and IC565. 3. Compare different Number System and basics of conversion of number System. 4. Realize different minimization technique to obtain minimized expression. 5. Design Combinational Circuits. 6. Design and develop Sequential Digital Circuits.
3	OBJECT ORIENTED PROGRAMMING	4KS03	1. To illustrate the basic concept of objects & Classes, Constructors, Arrays of object++ String class. 2. To explain the concept of operator overloading, Data Conversion, Pointers & Arrays. 3. To demonstrate the use of Inheritance & containership in C++. 4. To implement the concept of Abstract Classes & Virtual functions. 5. To outline the concept of streams and file handling in C++. 6. To demonstrate the use of Function templates, Class Templates & Exception Handling.
4	ASSEMBLY	4KS04	1. Describe how a CPU performs instructions

	LANGUAGE PROGRAMMING		during the fetch-decode-execute cycle and how the memory supports its actions and also able to edit, compile. execute, and debug an assembler program. 2. Explain how standard arithmetic operations (+... and /) are performed by the hardware and explain the uses of various machine addressing modes and why they are used. Perform Read, write, and debug programs in assembly language. 3. Describe the operation of various logic gates and the theory (Boolean algebra) behind them. Implement conditional and looping structures within an assembler program and create and use assembly subroutines. 4. Explain the internal workings of the machine on a procedure call and describe the structure of the call frame. Distinguish between situations in which procedurals or macros are appropriate. 5. Determine the pin configuration of IC's. Determine the internal organization of memory and also able to identify the address decoding techniques. 6. Identify the types of interrupts with their priority and able to explain the interrupt controller IC.
5	THEORY OF COMPUTATION	4KS05	1. To construct finite state machines to solve problems in computing. 2. To write regular expressions for the formal languages. 3. To construct and apply well defined rules for parsing techniques in compiler. 4. To construct and analyze Push Down, Turing Machine for formal languages. 5. To express the understanding of the Chomsky Hierarchy. 6. To express the understanding of the decidability and un-decidability problems.

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Semester-5th

Sr. No	Subject Name	Subject Code	CO's
1	DATA COMMUNICATION	5KS01	1. Design and Test different encoding and modulating techniques to change digital – to- digital conversion, analog-to-digital conversion, digital to analog conversion, analog to analog conversion. 2. Explain the various multiplexing methods and evaluate the different error detection & correction techniques. 3. Understand and realize the data link control and data link protocols. 4. Describe and demonstrate the various Local area networks and the IEEE standards. 5. Describe and Explain data communication system using the characteristics specified and Conclude co-relation of theory concept with practices.
2	FILE STRUCTURE & DATA PROCESSING	5KS02	1. Describe operating system concepts and process. 2. Implement concept of CPU scheduling and deadlock. 3. Implement memory management techniques. 4. Explain file system and free space management. 5. Describe I/O system and disk scheduling. 6. Implement operating system concept with reference to linux system.
3	SYSTEM SOFTWARE	5KS03	1. Identify the fundamentals of compiler and its phases. 2. Understand the concept of syntax analysis and solve the problems of predictive parsing. 3. Design and differentiate top down and bottom-up parsing techniques. 4. Apply syntax directed translation to construct syntax trees. 5. Relate various storage allocation strategies of compiler. 6. Evaluate intermediate code and target code from the source code.
4	SWITCHING THEORY & LOGIC DESIGN	5KS04	1. Explain fundamental of VHDL Programming. 2. Differentiate architectural styles of VHDL constructs. 3. Demonstrate different methods to obtain minimized expression. 4. Understand basic Combinational Circuits.

			5. Design Combinational circuits. 6. Construct Sequential digital circuits.
5	COMMUNICATION SKILLS	5KS05	1. Course outcomes number one state the importance of study of communication skills for engineering. 2. Master the required skills listening reading writing and speaking for being a working professional; Writing effective proposals, report etc. 3. Identify Strategies for improving communication in social and professional relationships. 4. Identify and apply Strategies for effective communication using Technology.

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Semester-6th

Sr. No	Subject Name	Subject Code	CO's
1	OPERATING SYSTEM	6KS01	1. Describe operating system concepts and process. 2. Implement concept of CPU scheduling and deadlock. 3. Implement memory management techniques. 4. Explain file system and free space management. 5. Describe 10 system and disk scheduling. 6. Implement operating system concept with reference to lines systems.
2	DATABASE SYSTEM	6KS02	1. Explain database system is built and its advantages over file system. 2. Describe basic constructs and terminology of database systems with different Keys and how it is useful for efficient access of data. 3. Demonstrate SQL i.e. basic programming language with proper syntax to store, retrieve and operate o data. 4. Design proper database model which should well-mannered with specific normal form. 5. Apply serialization on schedules and dealing with various types of Serializability with brief knowledge of Query processing. 6. Apply concurrency control of transactions with deadlock handling.
3	COMPUTING RESOURCE MANAGEMENT	6KS03	1. Understand and perform the key steps in the development of a strategic business plan for new or existing companies. 2. To Evaluate company's performance including financials, market share, innovation, and employment. 3. To Develop a suitable budget for a new project. 4. To Identify important risks facing a new project. 5. Understand the integration of technical, financial, human resources and legal aspects of public and private enterprises. 6. Understand the administration, ownership, and organization of natural resources management enterprises.
4	COMPUTER ARCHITECTURE	6KS04	1. To familiarize the basic concepts and structure of computers. 2. To Understand concepts of arithmetic

			operations. 3. To help students in understanding of addressing modes and memory organization. 4. To understand Conceptualize multitasking ability of a computer and pipelining 5. To facilitate students in learning IO communication
5	PROFESSIONAL ETHICS	6KS06	1. The goal of this course is to define the concept of ethics and its relationship to morality and the law. Student will be capable of identifying moral and immoral issues related to the ethics. 2. To identify excuses and justifications for conducting unethical business practices. Students will be able evaluate real ethics violations and determine outcomes through a detailed case study. Also, they will be able to evaluate real ethics violations and determine outcomes through a detailed case study. 3. To demonstrate and understanding of the legal, ethical, and social responsibilities of business toward their members, their customer, and the natural environment. Demonstrate the ability to recognize and solve contemporary ethical and social issues in the business, economics or public administration decision making process.

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Semester-7th

Sr. No	Subject Name	Subject Code	CO's
1	DIGITAL SIGNAL PROCESSING	7KS01	1. Differentiate between analog, continuous time, discrete time, and digital signals with the basic operations involved in signal conversion. 2. Perform calculations to convolve, to correlate finite sequences and able to analyze whether the system is stable or not. 3. Apply Z transform properties and theorems to find the response of digital system. 4. Examine the Discrete time Fourier transform using DIT-FFT and DIF-FFT algorithms. 5. Design IIR, FIR filter by using Direct I, Direct II, cascade, Parallel forms of filter. 6. Compare and contrast the digital low pass and high pass FIR & IIR filters to satisfy given frequencies and attenuation factors.
2	COMPUTER NETWORK	7KS02	1. Describe operating system concepts and process. 2. Implement concept of CPU scheduling and deadlock. 3. Implement memory management techniques. 4. Explain file system and free space management. 5. Describe LO system and disk scheduling. 6. Implement operating system concept with reference to linux system.
3	DESIGN AND ANALYSIS OF ALGORITHM	7KS03	1. Understand and compare different algorithms for calculating time and space complexity using asymptotic notations. 2. Comprehend and analyze the divide-and-conquer strategy for design and analysis of various algorithms. 3. Understand and apply greedy method to various algorithms in order to compute optimal solution and devise asymptotic notation. 4. Interpret and analyze dynamic programming approach for designing graph and matrix-based algorithms. 5. Design and analyze concept of backtracking for search and traversal algorithms. 6. Apply the knowledge gained to infer the efficiency of algorithms considering time and space trade off.

4	OBJECT ORIENTED ANALYSIS & DESIGN	7KS04	1. To define and explain object-oriented modeling concept and class modeling. 2. To distinguish advanced class modeling and advance state modeling with its characteristics. To discuss interaction modeling and advanced interaction modeling. 3. To analyze and design the process overview, system conception and domain analysis. 4. To explain object-oriented methodology for software development in the problem domain using types of application analysis and system design. 5. To illustrate class design concept and shows how to select analysis model and provide a basis for implementation. 6. Customization and exploration of Rational Rose Software and Unified Modeling Language. Also con struct the different UML diagrams like Class diagram, Component Diagram, Use Case Diagram, Object Diagram, Sequence Diagram, Activity Diagram, State Diagram, Deployment diagram. Collaboration Diagram
5	WEB ENGINEERING	7KS05	1. To discuss web architecture, its principles and review the protocol suites. 2. To apply the knowledge of HTML and CSS to create personal and business websites using current professional and industrial standard. 3. Design and Develop data transfer scripts using XML language for the transfer of data over the Internet. 4. To formulate maximum flexibility for XML documents validation with XML Schema over DTD. 5. To create an interactive session in Java script, between user and the server using objects and functions. 6. To summarize relation between the user and server generated from the web server through automated response with the help of CGI.

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Semester-8th

Sr. No	Subject Name	Subject Code	CO's
1	ARTIFICIAL INTELLIGENCE	8KS01	1. Identify appropriate problem specification and explore various AI techniques to understand problem characteristics. 2. Familiar with terminology used in this topical area such as draw problem tree and graph to represent knowledge. Interpret various weak methods. 3. Explain game playing using minmax search procedure and illustrate alpha-beta cut-offs using additional refinement. 4. Express Knowledge Representation and convert to clause form, and apply Resolution in prepositional and predicate logic. 5. Compare various structural Representation of knowledge finding the right structure as needed. Demonstrate using semantic nets, conceptual dependency, frames and Scripts. 6. Explore Natural Language understanding by analyzing syntax and semantics to develop understanding single and multiple sentences.
2	EMBEDDED SYSTEM	8KS02	1. Describe the basics of embedded systems and structural core units as well as memory organization for embedded system. 2. Explain components of embedded system, characteristics and quality attributes of embedded systems. 3. Discuss role of 8051 microcontroller and its architecture in design of embedded systems 4. Examine the different Addressing modes and Instruction Set of 8051 microcontrollers. 5. Use knowledge of C programming to do embedded programming. 6. Assess the Real-Time Operating System concepts with VxWorks RTOS.
3	SOFTWARE ENGINEERING	8KS03	1. To define software engineering and explain its importance. 2. To study the concepts of software products and software processes. 3. To explain the importance of process visibility. 4. To introduce the notion of professional responsibility. 5. Software engineering is a process of

			developing software using engineering principles. Some advantages include predefined, consistent solutions to common problems and standardized methods of implementation, reengineering and testing serves as a guide to a maturing engineering discipline. 6. Software engineering is the establishment and use of sound engineering principles in Order to obtain economically software that is reliable and works efficiently on real machines. 7. Software Engineering: (1) The application of a systematic, disciplined, quantifiable approach. 8. To develop the operation, and maintenance of software.
4	NETWORK SECURITY	8KS04	1. To understand the linear and nonlinear data Structures and its memory representations. 2. To perform different operations on data structures such as insertion, deletion, searching and traversing. 3. To understand various data searching and sorting methods with its complexity. 4. To introduce various techniques for representation of the data in the real world.

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- **Program educational objective (PEO's)**

PE01. Preparation: To prepare students for successful careers in software industry that meet the needs of Indian and multinational companies or to excel in Higher studies.

PEO2. Core competence: To develop the ability among students to synthesize data and technical concepts for software design and development.

PEO3. Breadth: To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach and an ability to relate engineering issues to broader social context.

PEO4. Professionalism: To provide students with a sound foundation in the mathematical, scientific and computer engineering fundamentals required to solve engineering problems and also pursue higher studies.

PEO5. Learning Environment: To promote student with an academic environment aware of excellence, leadership, written ethical codes and guidelines and the life-long learning needed for a successful professional career.

- **Program Outcomes (PO's) Engineering Graduate will be able to:**

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, review research literature, and analyse 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 modeling 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.

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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 effective reports and design documentation, make effective presentations, and 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 Specific Outcomes (PSO's)**

PSO1: Foundation of Computer System Development: Ability to use knowledge of computer systems and design principles in building the hardware and software components / products in the domain of embedded system, artificial intelligence, databases, networking, web technology and mobile computing.

PSO2: Problem Solving Ability: Ability to apply knowledge in various problem domains and implement innovative / suitable solutions to cater to needs of industry, business and e-governance by imbibing highest ethical and economical values.

- **Course Outcomes-CO's**

Semester-3rd

Sr. No	Subject Name	Subject Code	CO's
1	MATHEMATICS – II	3KS01	1. Apply the knowledge to solve differential equation by different method. 2. Solve Laplace Transform by making use of its properties and evaluate differential equation by Laplace transform. 3. Solve the Difference equation and Apply z-transform on Discrete function. 4. Solve partial differential equation of first order and 5. Determine Fourier Sine and Cosine transform of function. 6. Determine analytic function, Taylor and Laurent's series. Apply the knowledge of vector calculus to solve physical problem.
2	DISCRETE STRUCTURE & GRAPH THEORY	3KS02	1. Analyze and express logic sentence in terms of predicates, quantifiers, and logical connectives. 2. Derive the solution for a given problem using deductive logic and prove the solution based on logical inference. 3. Apply algorithms and use the definitions to solve the problems to proof statements in

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			elementary number theory. 4. Classify algebraic structure for a given mathematical problem. 5. Perform combinatorial analysis to solve counting problems. 6. Develop the given problem as graph networks and solve with techniques of graph theory
3	OBJECT ORIENTED PROGRAMMING	3KS03	1. Apply Object Oriented approach to design software. 2. Implement programs using classes and objects. 3. Specify the forms of inheritance and use them in programs. 4. Analyze polymorphic behaviors of objects. 5. Design and develop GUI programs. 6. Develop Applets for web applications
4	DATA STRUCTURES	3KS04	1. Understand the of basic data structures for storage and retrieval of linear and nonlinear data structure. 2. Apply knowledge of data structures to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure. 3. Differentiate between arrays & linked list which is used to implement list of abstract data types. 4. Understand the tradeoffs between stacks and queues which can make appropriate design decisions based on application data requirements. 5. Design and develop the data structures such as tree by using C as the programming language using static or dynamic implementations. 1. Recognize the importance of Graph and its application in real world scenarios.
5	ANALOG & DIGITAL ELECTRONICS	3KS05	1. Explain basic concepts of semiconductor devices and its application. 2. Identify applications of semiconductor devices (FET & MOSFET). 3. Compare different Number System and basics of conversion of number systems. 4. Realize different minimization technique to obtain minimized expression. 5. Design Combinational Circuits. 6. Design and Develop Sequential Circuits
6	ENVIRONMENTAL STUDIES *	4ES06	1. Comprehend the knowledge of environment and natural resources. 2. Use the concept of ecosystem. 3. Implement the biodiversity conservation

			methods and its importance. 4. Analysis of environmental pollution and types of disaster. 5. Analysis of Increases in population growth with its impact on environment and anthropogenic activities.

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Semester-4th

Sr. No	Subject Name	Subject Code	CO's
1	ARTIFICIAL INTELLIGENCE	4KS01	1. Explain concepts of Artificial Intelligence and different types of intelligent agents and their architecture. 2. Formulate problems as state space search problem & efficiently solve them. 3. Summarize the various searching techniques, constraint satisfaction problem and example problems - game playing techniques. 4. Apply AI techniques in applications which involve perception, reasoning and learning. 5. Compare the importance of knowledge, types of knowledge, issues related to knowledge acquisition and representation.
2	DATA COMMUNICATION & NETWORKING	4KS02	1. Understand and enumerate network communication using the 1fered concept with the OSI and TCP/IP Model, various types of transmission media and switching techniques. 2. Evaluate the data communication link considering the elementary concepts of data link layer protocols for error detection & correction techniques and the idea behind the physical addressing. 3. Identify the different types of network devices and their functions within network and building the skills of subnetting & supernetting. 4. Compare IPv4 with IPv6 addressing and design algorithms used in Routing. 5. Apply various services provided by transport layer in networking. 6. Recognize the functions performed by a Network Management System and understand the principles behind the various application layer protocols.
3	OPERATING SYSTEM	4KS03	1. Describe Operating System Concepts and Process. 2. Implement process scheduling algorithms. 3. Analyze the deadlock situation and resolve it. 4. Apply memory management techniques to avoid issues like external fragmentation, internal fragmentation, page fault. 5. Explain file system and free space management. 6. Investigate disk scheduling algorithms to

			improve throughput
4	MICROPROCESSOR & ASSEMBLY LANG. PROG.	4KS04	1. Describe 8086 microprocessor and its architecture; also understand instruction processing during the fetch-decode-execute cycle. 2. Design and Test assembly language programs using 8086 microprocessor instruction set. 3. Demonstrate the implementation of standard programming constructs, including control structures and functions, in assembly language. 4. Analyze the internal workings of the microprocessor on a procedure call and macros defined by user in an assembly language program. 5. Identify the types of interrupts with their priority and understand the programming of 8086 microprocessor interrupts. 6. Explain the basic concepts of Internet of Things.
5	THEORY OF COMPUTATION	4KS05	1. To construct finite state machines to solve problems in computing. 2. To write regular expressions for the formal languages. 3. To construct and apply well defined rules for parsing techniques in compiler. 4. To construct and analyze Push Down, Turing Machine for formal languages. 5. To express the understanding of the Chomsky Hierarchy. 6. To express the understanding of the decidability and un-decidability problems.

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Semester-5th

Sr. No	Subject Name	Subject Code	CO's
1	DATA COMMUNICATION	5KS01	1. Design and Test different encoding and modulating techniques to change digital – to- digital conversion, analog-to-digital conversion, digital to analog conversion, analog to analog conversion. 2. Explain the various multiplexing methods and evaluate the different error detection & correction techniques. 3. Understand and realize the data link control and data link protocols. 4. Describe and demonstrate the various Local area networks and the IEEE standards. 5. Describe and Explain data communication system using the characteristics specified and Conclude co-relation of theory concept with practices.
2	FILE STRUCTURE & DATA PROCESSING	5KS02	1. Describe operating system concepts and process. 2. Implement concept of CPU scheduling and deadlock. 3. Implement memory management techniques. 4. Explain file system and free space management. 5. Describe I/O system and disk scheduling. 6. Implement operating system concept with reference to linux system.
3	SYSTEM SOFTWARE	5KS03	1. Identify the fundamentals of compiler and its phases. 2. Understand the concept of syntax analysis and solve the problems of predictive parsing. 3. Design and differentiate top down and bottom-up parsing techniques. 4. Apply syntax directed translation to construct syntax trees. 5. Relate various storage allocation strategies of compiler. 6. Evaluate intermediate code and target code from the source code.
4	SWITCHING THEORY & LOGIC DESIGN	5KS04	1. Explain fundamental of VHDL Programming. 2. Differentiate architectural styles of VHDL constructs. 3. Demonstrate different methods to obtain minimized expression.

			4. Understand basic Combinational Circuits. 5. Design Combinational circuits. 6. Construct Sequential digital circuits.
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Semester-6th

Sr. No	Subject Name	Subject Code	CO's
1	OPERATING SYSTEM	6KS01	1. Describe operating system concepts and process. 2. Implement concept of CPU scheduling and deadlock. 3. Implement memory management techniques. 4. Explain file system and free space management. 5. Describe 10 system and disk scheduling. 6. Implement operating system concept with reference to lines systems.
2	DATABASE SYSTEM	6KS02	1. Explain database system is built and its advantages over file system. 2. Describe basic constructs and terminology of database systems with different Keys and how it is useful for efficient access of data. 3. Demonstrate SQL i.e., basic programming language with proper syntax to store, retrieve and operate o data. 4. Design proper database model which should well-mannered with specific normal form. 5. Apply serialization on schedules and dealing with various types of Serializability with brief knowledge of Query processing. 6. Apply concurrency control of transactions with deadlock handling.
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4	COMPUTER ARCHITECTURE	6KS04	1. To familiarize the basic concepts and structure of computers.

			2. To Understand concepts of arithmetic operations. 3. To help students in understanding of addressing modes and memory organization. 4. To understand Conceptualize multitasking ability of a computer and pipelining. 5. To facilitate students in learning IO communication
5	PROFESSIONAL ETHICS	6KS06	1. The goal of this course is to define the concept of Ethics and its relationship to morality and the law. Student will be capable of identifying moral and immoral issues related to the ethics. 2. To identify excuses and justifications for conducting unethical business practices. Students will be able evaluate real ethics violations and determine outcomes through a detailed case study. Also they will be able to evaluate real ethics violations and determine outcomes through a detailed case study. 3. To demonstrate and understanding of the legal, ethical, and social responsibilities of business toward their members, their customer, and the natural environment. Demonstrate the ability to recognize and solve contemporary ethical and social issues in the business, economics or public administration decision making process.

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Semester-7th

Sr. No	Subject Name	Subject Code	CO's
1	DIGITAL SIGNAL PROCESSING	7KS01	1. Differentiate between analog, continuous time, discrete time, and digital signals with the basic operations involved in signal conversion. 2. Perform calculations to convolve, to correlate finite sequences and able to analyze whether the system is stable or not. 3. Apply Z transform properties and theorems to find the response of digital system. 4. Examine the Discrete time Fourier transform using DIT-FFT and DIF-FFT algorithms. 5. Design IIR, FIR filter by using Direct I, Direct II, cascade, Parallel forms of filter. 6. Compare and contrast the digital low pass and high pass FIR & IIR filters to satisfy given frequencies and attenuation factors.
2	COMPUTER NETWORK	7KS02	1. Describe operating system concepts and process. 2. Implement concept of CPU scheduling and deadlock. 3. Implement memory management techniques. 4. Explain file system and free space management. 5. Describe LO system and disk scheduling. 6. Implement operating system concept with reference to linux system.
3	DESIGN AND ANALYSIS OF ALGORITHM	7KS03	1. Understand and compare different algorithms for calculating time and space complexity using asymptotic notations. 2. Comprehend and analyze the divide-and-conquer strategy for design and analysis of various algorithms. 3. Understand and apply greedy method to various algorithms in order to compute optimal solution and devise asymptotic notation. 4. Interpret and analyze dynamic programming approach for designing graph and matrix-based algorithms. 5. Design and analyze concept of backtracking for search and traversal algorithms.

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5	WEB ENGINEERING	7KS06	1. To discuss web architecture, its principles and review the protocol suites. 2. To apply the knowledge of HTML and CSS to create personal and business websites using current professional and industrial standard. 3. Design and Develop data transfer scripts using XML language for the transfer of data over the Internet. 4. To formulate maximum flexibility for XML documents validation with XML Schema over DTD. 5. To create an interactive session in Java script, between user and the server using objects and functions. 6. To summarize relation between the user and server generated from the web server through automated response with the help of CGI.

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Semester-8th

Sr. No	Subject Name	Subject Code	CO's
1	ARTIFICIAL INTELLIGENCE	8KS01	1. Identify appropriate problem specification and explore various AI techniques to understand problem characteristics. 2. Familiar with terminology used in this topical area such as draw problem tree and graph to represent knowledge. Interpret various weak methods. 3. Explain game playing using minmax search procedure and illustrate alpha-beta cut-offs using additional refinement. 4. Express Knowledge Representation and convert to clause form, and apply Resolution in prepositional and predicate logic. 5. Compare various structural Representation of knowledge finding the right structure as needed. Demonstrate using semantic nets, conceptual dependency, frames and Scripts. 6. Explore Natural Language understanding by analyzing syntax and semantics to develop understanding single and multiple sentences.
2	EMBEDDED SYSTEM	8KS02	1. Describe the basics of embedded systems and structural core units as well as memory organization for embedded system. 2. Explain components of embedded system, characteristics and quality attributes of embedded systems. 3. Discuss role of 8051 microcontroller and its architecture in design of embedded systems 4. Examine the different Addressing modes and Instruction Set of 8051 microcontrollers. 5. Use knowledge of C programming to do embedded programming. Assess the Real-Time Operating System concepts with VxWorks RTOS.
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			5. Software engineering is a process of developing software using engineering principles. Some advantages include predefined, consistent solutions to common problems and standardized methods of implementation, reengineering and testing serves as a guide to a maturing engineering discipline. 6. Software engineering is the establishment and use of sound engineering principles in Order to obtain economically software that is reliable and works efficiently on real machines. 7. Software Engineering: (1) The application of a systematic, disciplined, quantifiable approach. 8. To develop the operation, and maintenance of software.
4	NETWORK SECURITY	8KS04	1. To understand the linear and nonlinear data Structures and its memory representations. 2. To perform different operations on data structures such as insertion, deletion, searching and traversing. 3. To understand various data searching and sorting methods with its complexity. 4. To introduce various techniques for representation of the data in the real world.

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Academic Year- 2021-2022

- **Program educational objective (PEO's)**

PE01. Preparation: To prepare students for successful careers in software industry that meet the needs of Indian and multinational companies or to excel in Higher studies.

PEO2. Core competence: To develop the ability among students to synthesize data and technical concepts for software design and development.

PEO3. Breadth: To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach and an ability to relate engineering issues to broader social context.

PEO4. Professionalism: To provide students with a sound foundation in the mathematical, scientific and computer engineering fundamentals required to solve engineering problems and also pursue higher studies.

PEO5. Learning Environment: To promote student with an academic environment aware of excellence, leadership, written ethical codes and guidelines and the life-long learning needed for a successful professional career.

- **Program Outcomes (PO's) Engineering Graduate will be able to:**

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, review research literature, and analyse 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 modeling 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.

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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 effective reports and design documentation, make effective presentations, and 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 Specific Outcomes (PSO's)**

PSO1: Foundation of Computer System Development: Ability to use knowledge of computer systems and design principles in building the hardware and software components / products in the domain of embedded system, artificial intelligence, databases, networking, web technology and mobile computing.

PSO2: Problem Solving Ability: Ability to apply knowledge in various problem domains and implement innovative / suitable solutions to cater to needs of industry, business and e-governance by imbibing highest ethical and economical values.

- **Course Outcomes-CO's**

Semester-3rd

Sr. No	Subject Name	Subject Code	CO's
1	MATHEMATICS – II	3KS01	1. Apply the knowledge to solve differential equation by different method. 2. Solve Laplace Transform by making use of its properties and evaluate differential equation by Laplace transform. 3. Solve the Difference equation and Apply z-transform on Discrete function. 4. Solve partial differential equation of first order and 5. Determine Fourier Sine and Cosine transform of function. 6. Determine analytic function, Taylor and Laurent's series. Apply the knowledge of vector calculus to solve physical problem.
2	DISCRETE STRUCTURE & GRAPH THEORY	3KS02	1. Analyze and express logic sentence in terms of predicates, quantifiers, and logical connectives.

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			2. Derive the solution for a given problem using deductive logic and prove the solution based on logical inference. 3. Apply algorithms and use the definitions to solve the problems to proof statements in elementary number theory. 4. Classify algebraic structure for a given mathematical problem. 5. Perform combinatorial analysis to solve counting problems. 6. Develop the given problem as graph networks and solve with techniques of graph theory
3	OBJECT ORIENTED PROGRAMMING	3KS03	1. Apply Object Oriented approach to design software. 2. Implement programs using classes and objects. 3. Specify the forms of inheritance and use them in programs. 4. Analyze polymorphic behavior of objects. 5. Design and develop GUI programs. 6. Develop Applets for web applications
4	DATA STRUCTURES	3KS04	1. Understand the of basic data structures for storage and retrieval of linear and nonlinear data structure. 2. Apply knowledge of data structures to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure. 3. Differentiate between arrays & linked list which is used to implement list of abstract data types. 4. Understand the tradeoffs between stacks and queues which can make appropriate design decisions based on application data requirements. 5. Design and develop the data structures such as tree by using C as the programming language using static or dynamic implementations. 6. Recognize the importance of Graph and its application in real world scenarios.
5	ANALOG & DIGITAL ELECTRONICS	3KS05	1. Explain basic concepts of semiconductor devices and its application. 2. Identify applications of semiconductor devices (FET & MOSFET). 3. Compare different Number System and basics of conversion of number systems. 4. Realize different minimization technique to obtain minimized expression. 5. Design Combinational Circuits.

			6. Design and Develop Sequential Circuits
6	ENVIRONMENTAL STUDIES *	4ES06	1. Comprehend the knowledge of environment and natural resources. 2. Use the concept of ecosystem. 3. Implement the biodiversity conservation methods and its importance. 4. Analysis of environmental pollution and types of disaster. 5. Analysis of Increases in population growth with its impact on environment and anthropogenic Activities.

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Semester-4th

Sr. No	Subject Name	Subject Code	CO's
1	ARTIFICIAL INTELLIGENCE	4KS01	6. Explain concepts of Artificial Intelligence and different types of intelligent agents and their architecture. 7. Formulate problems as state space search problem & efficiently solve them. 8. Summarize the various searching techniques, constraint satisfaction problem and example problems - game playing techniques. 9. Apply AI techniques in applications which involve perception, reasoning and learning. 10. Compare the importance of knowledge, types of knowledge, issues related to knowledge acquisition and representation.
2	DATA COMMUNICATION & NETWORKING	4KS02	1. Understand and enumerate network communication using the 1fered concept with the OSI and TCP/IP Model, various types of transmission media and switching techniques. 2. Evaluate the data communication link considering the elementary concepts of data link layer protocols for error detection & correction techniques and the idea behind the physical addressing. 3. Identify the different types of network devices and their functions within network and building the skills of subnetting & supernetting. 4. Compare IPv4 with IPv6 addressing and design algorithms used in Routing. 5. Apply various services provided by transport layer in networking. 6. Recognize the functions performed by a Network Management System and understand the principles behind the various application layer protocols.
3	OPERATING SYSTEM	4KS03	1. Describe Operating System Concepts and Process. 2. Implement process scheduling algorithms. 3. Analyze the deadlock situation and resolve it. 4. Apply memory management techniques to avoid issues like external fragmentation, internal fragmentation, page fault. 5. Explain file system and free space management.

			6. Investigate disk scheduling algorithms to improve throughput
4	MICROPROCESSOR & ASSEMBLY LANG. PROG.	4KS04	1. Describe 8086 microprocessor and its architecture; also understand instruction processing during the fetch-decode-execute cycle. 2. Design and Test assembly language programs using 8086 microprocessor instruction set. 3. Demonstrate the implementation of standard programming constructs, including control structures and functions, in assembly language. 4. Analyze the internal workings of the microprocessor on a procedure call and macros defined by user in an assembly language program. 5. Identify the types of interrupts with their priority and understand the programming of 8086 microprocessor interrupts. 6. Explain the basic concepts of Internet of Things.
5	THEORY OF COMPUTATION	4KS05	1. To construct finite state machines to solve problems in computing. 2. To write regular expressions for the formal languages. 3. To construct and apply well defined rules for parsing techniques in compiler. 4. To construct and analyze Push Down, Turing Machine for formal languages. 5. To express the understanding of the Chomsky Hierarchy. 6. To express the understanding of the decidability and un-decidability problems.

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Semester-5th

Sr. No	Subject Name	Subject Code	CO's
1	DATABASE MANAGEMENT SYSTEMS	5KS01	1. Explain data model and depict a database system using E-R Diagram. 2. Design Database Application using Query Language. 3. Demonstrate validation of framework like integrity constraint, trigger and assertion. 4. Examine query for optimization and its cost-effective processing. 5. Develop transition processing approach for relational databases. 6. Construct database for real life application.
2	COMPILER DESIGN	5KS02	1. Describe the fundamentals of compiler and various phases of compilers. 2. Design and implement LL and LR parsers. 3. Solve the various parsing techniques like SLR, CLR, LALR. 4. Examine the concept of Syntax-Directed Definition and translation. 5. Assess the concept of Intermediate-Code Generation and run-time environment. 6. Explain the concept code generation and code optimization.
3	COMPUTER ARCHITECTURE & ORGANIZATION	5KS03	1. To familiarize the basic concepts and structure of computers. 2. To Understand concepts of arithmetic operations. 3. To help students in understanding of addressing modes and memory organization. 4. To understand Conceptualize multitasking ability of a computer and pipelining. 5. To facilitate students in learning IO communication.
4	DATA SCIENCE AND STATISTICS	5KS04	1. Demonstrate proficiency with statistical analysis of data. 2. Build skills in transformation and merging of data for use in analytic tools. 3. Perform linear and multiple linear regression analysis. 4. Develop the ability to build and assess data-based models. 5. Evaluate outcomes and make decisions based on data. 6. Develop the ability to apply data science concepts and methods to solve.

5	INTRODUCTION TO CYBERSECURITY	5KS04	1. Know fundamentals of Cybercrimes and Cyber offenses. 2. Realize the Cyber threats, attacks and Vulnerabilities. 3. Explore the industry practices and tools. 4. Comprehend the Access Control and Authentication Process. 5. Implement Intrusion Detection and Prevention.
5	ENTREPRENEURSHIP	5KS05	1. Analyze the business environment in order to identify business opportunities. 2. Identify the elements of success of entrepreneurial ventures. 3. Evaluate the effectiveness of different entrepreneurial strategies. 4. Specify the basic performance indicators of entrepreneurial activity. 5. Explain the importance of marketing and management in small businesses venture. 6. Interpret their own business plan.

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Semester-6th

Sr. No	Subject Name	Subject Code	CO's
1	SECURITY POLICY & GOVERNANCE	6KS01	1. List and discuss the key characteristics of Information Security, Leadership and Management. 2. Differentiate between Law and Ethics 3. Describe why ethical codes of conduct are important to Information Security. 4. Discuss the importance, benefits and desired outcomes of Information Security Governance. 5. Discuss the process of developing, implementing and maintaining various types of Information Security Policies. 6. Define Risk Management and its role in the organization.
2	DESIGN AND ANALYSIS OF ALGORITHMS	6KS02	1. Understand and compare different algorithms for calculating time and space complexity using asymptotic notations. 2. Comprehend and analyze the divide-and-conquer strategy for design and analysis of various algorithms. 3. Understand and apply greedy method to various algorithms in order to compute optimal solution and devise asymptotic notation. 4. Interpret and analyze dynamic programming approach for designing graph and matrix-based algorithms. 5. Design and analyze concept of backtracking for search and traversal algorithms. 6. Apply the knowledge gained to infer the efficiency of algorithms considering time and space trade off.
3	SOFTWARE ENGINEERING	6KS03	1. To define software engineering and explain its importance. 2. To study the concepts of software products and software processes. 3. To explain the importance of process visibility. 4. To introduce the notion of professional responsibility. 5. Software engineering is a process of developing software using engineering principles. Some advantages include predefined, consistent solutions to common problems and standardized

			methods of implementation, reengineering and testing serves as a guide to a maturing engineering discipline. 6. Software engineering is the establishment and use of sound engineering principles in Order to obtain economically software that is reliable and works efficiently on real machines. 7. Software Engineering: (1) The application of a systematic, disciplined, quantifiable approach. 8. To develop the operation, and maintenance of software.
4	NATURAL LANGUAGE PROCESSING	6KS04	1. Understand morphological analysis for lexeme 2. Describe role of different model in lexical analysis 3. Construct the parse tree based on context free grammar 4. Create the representation of meaning to perform semantic analysis 5. Apply the classification algorithm to perform prediction 6. Explain how to extract information from text
5	BIG DATA ANALYTICS	6KS04	1. Work with big data tools and its analysis techniques. 2. Analyze data by utilizing clustering and classification algorithms. 3. Learn and apply different algorithms and recommendation systems for large volumes of data. 4. Perform analytics on data streams. 5. Learn NoSQL databases and management.
6	CRYPTOGRAPHY	6KS04	1. Classify the symmetric encryption techniques. 2. Illustrate various public key cryptographic techniques. 3. Evaluate the authentication and hash algorithms. 4. Discuss authentication applications. 5. Summarize the intrusion detection and its solutions to overcome the attacks. 6. Understand basic concepts of system level security

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Semester-7th

Sr. No	Subject Name	Subject Code	CO's
1	DIGITAL SIGNAL PROCESSING	7KS01	1. Differentiate between analog, continuous time, discrete time, and digital signals with the basic operations involved in signal conversion. 2. Perform calculations to convolve, to correlate finite sequences and able to analyze whether the system is stable or not. 3. Apply Z transform properties and theorems to find the response of digital system. 4. Examine the Discrete time Fourier transform using DIT-FFT and DIF-FFT algorithms. 5. Design IIR, FIR filter by using Direct I, Direct II, cascade, Parallel forms of filter. 6. Compare and contrast the digital low pass and high pass FIR & IIR filters to satisfy given frequencies and attenuation factors.
2	COMPUTER NETWORK	7KS02	1. Describe operating system concepts and process. 2. Implement concept of CPU scheduling and deadlock. 3. Implement memory management techniques. 4. Explain file system and free space management. 5. Describe LO system and disk scheduling. 6. Implement operating system concept with reference to linux system.
3	DESIGN AND ANALYSIS OF ALGORITHM	7KS03	1. Understand and compare different algorithms for calculating time and space complexity using asymptotic notations. 2. Comprehend and analyze the divide-and-conquer strategy for design and analysis of various algorithms. 3. Understand and apply greedy method to various algorithms in order to compute optimal solution and devise asymptotic notation. 4. Interpret and analyze dynamic programming approach for designing graph and matrix-based algorithms. 5. Design and analyze concept of backtracking for search and traversal algorithms.

			6. Apply the knowledge gained to infer the efficiency of algorithms considering time and space trade off.
4	OBJECT ORIENTED ANALYSIS & DESIGN	7KS04	1. To define and explain object-oriented modeling concept and class modeling. 2. To distinguish advanced class modeling and advance state modeling with its characteristics. To discuss interaction modeling and advanced interaction modeling. 3. To analyze and design the process overview, system conception and domain analysis. 4. To explain object-oriented methodology for software development in the problem domain using types of application analysis and system design. 5. To illustrate class design concept and shows how to select analysis model and provide a basis for implementation. 6. Customization and exploration of Rational Rose Software and Unified Modeling Language. Also con struct the different UML diagrams like Class diagram, Component Diagram, Use Case Diagram, Object Diagram, Sequence Diagram, Activity Diagram, State Diagram, Deployment diagram. Collaboration Diagram
5	WEB ENGINEERING	7KS06	1. To discuss web architecture, its principles and review the protocol suites. 2. To apply the knowledge of HTML and CSS to create personal and business websites using current professional and industrial standard. 3. Design and Develop data transfer scripts using XML language for the transfer of data over the Internet. 4. To formulate maximum flexibility for XML documents validation with XML Schema over DTD. 5. To create an interactive session in Java script, between user and the server using objects and functions. 6. To summarize relation between the user and server generated from the web server through automated response with the help of CGI.

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Semester-8th

Sr. No	Subject Name	Subject Code	CO's
1	ARTIFICIAL INTELLIGENCE	8KS01	1. Identify appropriate problem specification and explore various AI techniques to understand problem characteristics. 2. Familiar with terminology used in this topical area such as draw problem tree and graph to represent knowledge. Interpret various weak methods. 3. Explain game playing using minmax search procedure and illustrate alpha-beta cut-offs using additional refinement. 4. Express Knowledge Representation and convert to clause form, and apply Resolution in prepositional and predicate logic. 5. Compare various structural Representation of knowledge finding the right structure as needed. Demonstrate using semantic nets, conceptual dependency, frames and Scripts. 6. Explore Natural Language understanding by analyzing syntax and semantics to develop understanding single and multiple sentences.
2	EMBEDDED SYSTEM	8KS02	1. Describe the basics of embedded systems and structural core units as well as memory organization for embedded system. 2. Explain components of embedded system, characteristics and quality attributes of embedded systems. 3. Discuss role of 8051 microcontroller and its architecture in design of embedded systems 4. Examine the different Addressing modes and Instruction Set of 8051 microcontrollers. 5. Use knowledge of C programming to do embedded programming. Assess the Real-Time Operating System concepts with VxWorks RTOS.
3	SOFTWARE ENGINEERING	8KS03	1. To define software engineering and explain its importance. 2. To study the concepts of software products and software processes. 3. To explain the importance of process visibility. 4. To introduce the notion of professional

			responsibility. 5. Software engineering is a process of developing software using engineering principles. Some advantages include predefined, consistent solutions to common problems and standardized methods of implementation, reengineering and testing serves as a guide to a maturing engineering discipline. 6. Software engineering is the establishment and use of sound engineering principles in Order to obtain economically software that is reliable and works efficiently on real machines. 7. Software Engineering: (1) The application of a systematic, disciplined, quantifiable approach. 8. To develop the operation, and maintenance of software.
4	NETWORK SECURITY	8KS04	1. To understand the linear and nonlinear data Structures and its memory representations. 2. To perform different operations on data structures such as insertion, deletion, searching and traversing. 3. To understand various data searching and sorting methods with its complexity. 4. To introduce various techniques for representation of the data in the real world.

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UG-IT

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AC-Year 2019-20, 2018-19, 2017-18

Course Outcomes (COs)

Sr. No.	Year	SEM	Subject	CO
1	2nd 2nd	III	Mathematics III 3IT01	➢ Identify and solve the ordinary differential equation with constant coefficients. ➢ Understand and formulate the Laplace transform to solve Differential equations. ➢ Define Higher order Differential Equations, Z-transform and it's inverse transform. ➢ Define and Formulate Fourier transforms and Partial differential equation of first order. ➢ Discuss Complex analysis and its methods, Understand Vector Calculus and its applications
2			Programming Methodology 3IT02	➢ Understand principles of object oriented programming. ➢ Explain and apply basic concepts of OOP. using Java Programming language. ➢ Apply the concept of a class and object for solving real life problems. ➢ Create Graphical user interface using Java Window toolkit and event handling mechanism. ➢ Differentiate Applet and Application programming and use applet programming to design interactive web page. ➢ Demonstrate various file handling input output operations and use of exception handling
3			Discrete Structures 3IT03	➢ Identify basic terminology of Mathematical Logic, Theory of inference & Predicate calculas ➢ Identify, illustrate, and solve engineering problems on the basis of set theory. ➢ Identify and Design an Algebraic Structures and grammer ➢ Examine and formulate the concept of Lattices & Boolean Algebra to solve engineering problems. ➢ Design and interpret data using graphs, trees and related algorithms. ➢ Identify and Design Finite State machines & Turing machines
4			Electronics Devices & Circuits 3IT04	➢ Memories the operation of Semiconductor devices and its applications. ➢ Explain the need of biasing and condition for faithful amplification of various transistor configurations. ➢ Understand operations of oscillators. ➢ Explain the parameters of Operational Amplifier and Discuss applications of Operational Amplifier. ➢ Evaluate various multivibrator circuits using IC555. ➢ Demonstrate and simulate various electronic

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				circuits using Pspice.
5			**Assembly Language Programming 3IT05**	➢ Understand the architecture of 8086/8088 microprocessor. ➢ Identify various addressing modes in 8086. ➢ Apply various instructions used in 8086/8088 for programming. ➢ Understand concepts of stack and subroutine. ➢ Describe interfacing of 8086 with programmable peripheral interface 8255 PPI. ➢ Describe 8086 interrupts and interfacing of programmable interrupt controller 8259 with 8086.
6			**C-Lab I 3IT09**	➢ Describe basics of the UNIX/LINUX operating system. ➢ Implement the general purpose utility commands. ➢ Design flowchart and execute C program in VI-editor. ➢ Apply concept of shell programming.
7		IV	**Data Structures 4IT01**	➢ Explain the role of data structures in structuring and manipulating data and understand the concepts of algorithm design and complexity theory. ➢ Understand memory representation and use appropriate linear data structures to solve problems. ➢ Differentiate and evaluate memory utilization in static and dynamic memory allocation and perform various operations on linear data structures like linked list, stack and queue. ➢ Understand nonlinear data structures and demonstrate applications of Tree, graph. ➢ Understand and demonstrate various sorting algorithm and their time complexities. ➢ Design and execute algorithms using appropriate linear and nonlinear data structures and know their real world application.
8			**Communication Engineering 4IT02**	➢ Explain the concept of various AM modulation technique & its transmission through communication channel. ➢ Understand how the AM signal is reconstructed at the receiver end. ➢ Explain the Generation and transmission of FM signal and compare FM signal with AM signal. ➢ Understand how the FM signal is reconstructed at the receiver end. ➢ Understand the concept of Sampling Theorem, Nyquist sampling theorem, Aliasing effect, & various Pulse modulation technique. ➢ Understand the signals and their analysis using Fourier series and Fourier Transform in frequency domain.

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9			Object Oriented Techniques 4IT03	➢ Define fundamental concepts that underline object oriented approaches to software development. ➢ Perform object oriented concepts like inheritance, operator overloading and containership in programming. ➢ Apply the concepts of virtual functions, friend functions, static functions and graphics ➢ Explain file related operations, error handling in file . ➢ Compare the concepts of class template & function template. ➢ Design & develop applications of creative and lateral thinking, most particularly in solving problems.
10			Social Sciences & Engineering Economics 4IT04	➢ State the importance of study of social sciences to Engineers. ➢ Discriminate the Composition and Power of Indian Parliament as well as Indian Constitution. ➢ Describe the Impact of Science and Technology on various aspects of human society. ➢ Recognize the various Economic systems and forms of Business organization ➢ Study the concepts of Principle of taxation , market and Economics of Development
11			Numerical Methods & Operation Research Techniques 4IT05	➢ Describe Error Analysis techniques along with the solution of Non Linear and polynomial equations. ➢ Generate the solution for Linear system equations and Regression techniques. ➢ Distinguish and evaluate the concept of Integrations and Differential equation. ➢ Describe the various Operation Research Models and evaluation of Dynamic programming methods ➢ Explain the concept of Linear programming and Sequencing problem and their evaluation ➢ Design PERT networks and CPM.
12			C-Lab II 4IT09	➢ Design a Web page using HTML basic tags. ➢ Add images to HTML web pages and link multiple HTML pages with the help of HTML tag. ➢ Create and design tables, frames and forms in HTML page. ➢ Design Web Page using Style sheets. ➢ Insert Java script in HTML web pages.
13	3rd	V	Operating Systems 5IT01	➢ Define a basic concept of operating system and illustrate concept of process management using scheduling algorithm. ➢ Discuss memory management using paging

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					and segmentation ➢ Define file system and free space management. ➢ Illustrate I/O system and disk scheduling. ➢ Tell summary of linux operating system. ➢ Illustrate process scheduling algorithms and memory management techniques.
14				**Digital Integrated Circuits 5IT02**	➢ To understand characteristics of DIC and logic family like TTL,CMOS etc. ➢ Analyze and design logic circuit using minimization techniques ➢ Design combinational logic circuit using universal gates. ➢ Design combinational logic circuit using MSI chip. ➢ Design and analyze synchronous and asynchronous sequential circuit using Flip-flop. ➢ Design and analyze Shift registers and ASM Charts
15				**Computer Architecture & Organisation 5IT03**	➢ Understand the basic concept of computer hardware, software, and addressing methods. ➢ Describe the working of multiple bus organization and micro- programmed control. ➢ Explain I/O interfacing, interrupts and direct memory access. ➢ Outline the memory organization of static & dynamic RAMs and its working difference. ➢ Perform arithmetic number representations, Booth's algorithm and design of fast adders and compare different I/O devices.
16				**Communication Skills 5IT04**	➢ Identify the need of communication skill. ➢ Identify strategies for improving communication in social and professional relationship. ➢ Explain and apply the rhetorical goal of persuasive and informative speaking and establish credibility. ➢ Identify and apply strategies for effective communication using technology.
17				**(i) Introduction to Computer Networks 5FEIT05**	➢ To understand basic concept of computer network, topologies and physical layer cabling used in networking. ➢ Understand various basic operations of the computer system ➢ Understand operation of OSI layers and various network components and interconnection of LAN. ➢ Understand TCP/IP layers and IPv4 and IPv6 addressing used in networking. ➢ Learn about the router configuration, router fundamentals and its modes. ➢ Use routing protocol for different network

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				applications.
18			(ii) IT Ethics & Practices 5FEIT05	➢ Describes an overview of ethics and, its importance in business and IT ➢ Define computer and internet crime, types of attacks, and security policies. ➢ Describes right of privacy, freedom of expression and issues related with it. ➢ Discuss intellectual property rights, software development and issues related with it. ➢ Discuss employer/employee issues and, whistle blowing situations ➢ Describes impact of IT on the quality of life, professional societies, and code of ethics for professionals.
19			C-Lab III	➢ Demonstrate LAMP installation and able write scripts in PHP ➢ Prepare different input techniques using forms ➢ Use the concepts of session and cookies ➢ Prepare database and access data through PHP scripts ➢ Prepare content management system
20		VI	Principles of Management 6IT01	➢ Learn the basic concept of management and also Study of human resource planning. ➢ Prepare the organization planning, their design and development along with production planning and control. ➢ Do Product design & development ➢ Study fundamental concepts of maintenance and system reliability, concept of failure analysis and Know the concept of TQM, ISO 9000 and quality audit. ➢ Learn about marketing management, pricing and promotion scheme and about sources of finance. ➢ Learn & apply concepts of project management and concepts.
21			Database Management Systems 6IT02	➢ Describe concept of database system. ➢ Discuss and apply the concept related with data model. ➢ Apply concepts of database integrity and security. ➢ Describe query processing and query optimization. ➢ Explain concept of transaction management and properties. ➢ Describe the concept of Concurrency control and study of various database protocols.
22			Theory of Computation 6IT03	➢ Construct Finite state machine and differentiate between deterministic finite automation and non-deterministic finite automation.

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				➢ Construct regular expressions and equivalence between RE and FA. ➢ Design Context free grammar, derivation trees, conversion of Context free grammar in to normal forms, design push down automata ➢ Design Turing machine and its model ➢ Discuss hierarchical structure of various languages and Grammar. ➢ Describe properties of recursive & non-recursive enumerable languages and solve post correspondence problems.
23			**Computer Networks 6IT04**	➢ Understand fundamentals of computer network, network architecture, services offered by OSI reference model. ➢ Discuss design issues of data link layer and elementary data link protocols with protocol verification. ➢ Apply routing methods and congestion control algorithm. ➢ Compare UDP services and TCP services. ➢ Define services of DNS and Multimedia. ➢ Illustrate computer network simulation using fundamentals of computer networks.
24			**E-Commerce 6FEIT05**	➢ Understand the difference between E-commerce, and E-business and know the Eight unique features of E-commerce technology. ➢ Discuss the concept of various models in E-commerce. ➢ Analyze the Ecommerce infrastructure, design a simple e-commerce Web Site and choose appropriate resources for it. ➢ Analyze Online Security and payment Systems in E-Commerce and Identify the key security threats in the e-commerce environment. ➢ Apply the ecommerce marketing concepts.
25			**(ii) Knowledge Mangement 6FEIT05**	➢ State the importance of knowledge and knowledge management ➢ Understand knowledge management,. knowledge intensive firms and knowledge workers, learning & KM ➢ Describe Innovation dynamics and knowledge processes, forgetting & unlearning knowledge ➢ Discriminate the influence of socio-cultural factors in motivating workers to participate in knowledge management initiatives and communities of practice ➢ Understand Cross community, Boundary spanning knowledge processes and Power, politics, conflict and knowledge processes ➢ Study ICT & knowledge management, facilitating KM via culture management and HRM practices, Leadership and KM

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26			C-Lab IV	➢ Understand Content management System framework. ➢ Differentiate between types of CMS. ➢ Discuss about Configuring templates in Joomla. ➢ Design menus, pages and users with different kinds or levels of permissions in Joomla. ➢ Configure front end modules as Breadcrumbs, Newsflash, Random Image, search and custom HTML.
27	4rth	VII	Digital Signal Processing 7IT01	➢ Classify ASP and DSP system. Demonstrate the knowledge of Analog to Digital and Digital to analog Conversion and DT Signals ➢ Classify and analyze Discrete Time Signals and Linear Time Invariant (LTI) Systems. ➢ Analyze DT LTI systems using Z Transform. Analyze DT LTI systems using Discrete Fourier Transform and Fast Fourier Transform. ➢ Design of FIR and IIR Digital Filters using various methods. ➢ Realize FIR and IIR Digital Filters using various implementation structure. ➢ Simulate different DSP concepts and filters using Scilab / Matlab and Analyze results.
28			Object Oriented System Analysis & Design 7IT02	➢ Apply the concept of object oriented Technology for designing software model. ➢ Design class model & state model using unified modelling language. ➢ Formulate the problem statement and design model using Rational Rose. ➢ Use software development life cycle for software model design. ➢ Devise a system into subsystem and find reusable resources. ➢ Analyze and design class model using advanced feature.
29			Web Technology 7It03	➢ Define introduction about Web technologies and express the Markup Languages. ➢ Apply the Style sheet and HTML documents. ➢ Practice the client-side programming, Introduction to Java Script ™ and define Document object Model. ➢ Analyze and practice Server-Side Programming, and discuss concept of Java Servlets. ➢ Construct java beans as well as develop Java Server pages ➢ Categorize Web Services: WSDL and Analyze Object Data :SOAP ➢ Develop web pages using Servlets, JSP, Markup languages and CSS.
30			Real Time	➢ State the components of Real Time Embedded

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			Embedded Systems 7It04	Systems. ➢ Label the structural units of the Processor and define context switching, deadline and interrupt latency. ➢ Use Programming languages and Data Structures in Embedded Systems. ➢ Design Embedded Systems using Finite State Machines, Petri Net and Data Flow Graph. ➢ Apply the concept of IPC and implement it in Embedded systems environment. ➢ Compare Real Time Operating System & Operating System.
31			PE-I (iii)Artificial Intelligence & Expert Systems 7IT05	➢ Describe Artificial Intelligence and their Problems. ➢ Describe Heuristic Search Techniques that is used for solving Problems come under Artificial Intelligence. ➢ Identify Knowledge Representation issues and Rules. ➢ Discriminate the concept of Symbolic Reasoning under uncertainty. ➢ Explain Natural language Processing, Expert System and Fuzzy logic System.
32			PE-I (i) Distributed DBMS 7IT05	➢ Define distributed data on the networks by using the concept of data communication. ➢ Design DBMS architecture and apply different alternative strategies to deal with the distributed data on the network. ➢ Know the problems, objectives, characteristics of query processing and model the layers of query processing. ➢ Demonstrate distributed concurrency control by applying serializability, locking based concurrency control algorithms and deadlock management. ➢ Identify the failures and fault tolerance in distributed systems and use local reliability protocols for dealing with site failures. ➢ Apply the fundamentals of ODBMS to deal with distributed database on the network.
33			PE-1 (ii) Modelling & Simulation 7It05	➢ Identify basic concepts of Systems & models. ➢ Identify and illustrate System Simulation & their types. ➢ Understand System Dynamics and various probability functions. ➢ Illustrate Simulation of Queueing System and Inventory Control. ➢ Formulate & evaluate General Purpose Simulation System Language.
34			Digital & Wireless Communication 8IT01	➢ Summarize the varies parameters to design efficient digital communication system. ➢ Understand error controlling techniques in digital data transmission ➢ Evaluating the different multiple access

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				schemes and describe the spread spectrum techniques ➤ Explain GSM Network architecture, protocols architecture , call handover, call authentication and security ➤ Know different wireless technology protocols like 802.11,802.15 and 802.16
35			**Network Administration & Security 8IT02**	➤ Understand the concept of security and process of standardization. ➤ Identify and apply techniques, approaches and tools used to discover cryptography in information security. ➤ Analyze authentication protocols and process. Know the concept of secure multipurpose mail extension. ➤ Identify how to apply IP Security, its importance and Secure electronic transactions. ➤ Understand basic concepts of Network Management Protocol. Classify Trusted systems and data access controls. ➤ Learn firewalls, password protection, password selection strategies, viruses, Trusted systems, data access control and prevent system vulnerabilities.
36			**Software Engineering 8IT03**	➤ Understand about Software process & process models. ➤ Express software measures, metrics and indicators in process & project domains and Software projects Planning and risks associated with it. ➤ Explain project scheduling and software quality assurance Concepts. ➤ Understand system and product engineering and design principles of system. ➤ Apply various software architecture principles for designing effective user interface. ➤ Understand Software testing fundamentals.
37			**PE-II Web Commerce 8It04**	➤ Identify basic web commerce concepts and electronic commerce modes. ➤ Identify and illustrate, the approach of secure transport protocol and transition. ➤ Understand electronic cash and electronic payment schemes. ➤ Identify the various security issues and their solutions. ➤ Illustrate the secure email technologies, the internet and website establishment.
38			**PE-II Cloud Computing 8It04**	➤ To Describe the basic architecture of cloud computing as well as cloud services, deployment model. Recognized the impact of cloud computing in IT Sector. ➤ Recognize the possible threats in cloud computing services & to implement security mechanism to remove them. ➤ Explore managing proper access control of cloud resources & recognized identity of users & preserve it.

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				➢ Describe the privacy in cloud computing as well as they will be able to identify the risk in privacy & manage it, also they will be understand the international laws & regulations to maintain privacy. ➢ Describe the Audit & compliance in cloud computing, and recognized control objectives for cloud computing and find regulatory/ external compliance.
39			C-Lab V 8IT07	➢ Understand how to develop problem statement ➢ Able to find out the user requirements. ➢ Identify Use Cases and develop the Use Case model that captures requirements for a software system. ➢ Understand how models help us to visualize a system. ➢ Have a working ability and grasping attitude to design and conduct object-oriented analysis and design experiments using UML, as well as to analyze and evaluate their models.

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Course Outcomes (COs)

Sr. No.	Year	SEM	Subject	CO
1	2nd 2nd	III	Mathematics-III **3IT01**	➢ Identify and solve the ordinary differential equation with constant coefficients. ➢ Understand and formulate the Laplace transform to solve Differential equations. ➢ Define Higher order Differential Equations, Z-transform and it's inverse transform. ➢ Define and Formulate Fourier transforms and Partial differential equation of first order. ➢ Discuss Complex analysis and its methods, Understand Vector Calculus and its applications
2			Discrete Structure & Graph Theory **3IT02**	➢ Identify basic terminology of Mathematical Logic, Theory of inference & Predicate calculus ➢ Identify, illustrate, and solve engineering problems on the basis of set theory. ➢ Identify and Design an Algebraic Structures and grammer ➢ Examine and formulate the concept of Lattices & Boolean Algebra to solve engineering problems. ➢ Design and interpret graphs and Finite State Machines
3			Object Oriented Programming **3IT03**	➢ Explain and apply basic concepts of OOP using Java programming language ➢ Apply and implement OOP concepts like method, constructor and Array. ➢ Apply the OOP principles in programming for solving real life problems. ➢ Demonstrate various file handling input output operations and use of exception handling. ➢ Create Graphical user interface using applet, Java Window toolkit and event handling mechanism. ➢ Design and implement Java application using object oriented programming paradigm.
4			Assembly Language Programming **3IT04**	➢ Describe the architecture of 8086/8088 microprocessor and various addressing modes. ➢ Demonstrate various instructions used in data transfer, arithmetic operations in 8086 microprocessor. ➢ Demonstrate various control flow instructions used in 8086. ➢ Demonstrate the concept of stack subroutine and MACROS using various instructions. ➢ Illustrate interrupt types and interfacing of 8086 with programmable peripheral interface 8255 PPI.

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				➢ Execute various instructions used in 8086.
5			Analog & Digital Electronics **3IT05**	➢ Outline the basic applications of BJT. ➢ Get acquainted with analog ICs like Op-Amp IC-741 and Timer IC-555 ➢ Discriminate the working of sinusoidal and non-sinusoidal waveform generators. ➢ Apply the concept of K-map to simplify logic expressions. ➢ Design and implement combinational & sequential circuits ➢ Test various analog and digital circuits
6			Comp. Skil Lab.-I **3IT09**	➢ Describe the basics of python programming. ➢ Understand the various syntax and looping statement in python ➢ Execute the basic programs using python. ➢ Apply the concept of different data types using program.
7		IV	Computer Organization & Architecture **4IT01**	➢ Describe the basic structure of computer including functional units, addressing modes, stacks, queues, subroutines, etc. ➢ Explain the basic processing unit of computer, execution of a complete instruction. ➢ Describe input/output organization of computer including interrupt, DMA, buses, interfaces, etc. ➢ Explain the concepts of RAM, ROM, cache memory, virtual memory. ➢ Perform computer arithmetic operation.
8			Data Communication & Networking **4IT02**	➢ Understand the principles and fundamental concept of computer networks. ➢ Understand and explain data communication system with its techniques and applications. ➢ Identify various error detection and correction techniques in data transmission. ➢ Evaluating the network addresses and learning routing mechanism protocols. ➢ Design TCP connection and analyze upper OSI layer functions and services. ➢ Explore the network design and its applications to digital world.
9			Operating System **4IT03**	➢ Fundamental understanding of the role of Operating Systems, concept of a process and thread. ➢ To apply the concept of process scheduling and concurrency control to different scenarios. ➢ To understand and apply the concept deadlock and basic Memory Management ➢ To realize virtual memory management schemes. ➢ To realize the concept of File system management. ➢ Apply the concept of process scheduling, page replacement and memory management techniques.
10			Data Structures **4IT04**	➢ Recognize various data structures, their memory management and illustrate algorithms using

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				array. ➢ Demonstrate various operations on linked list using dynamic memory allocation. ➢ Demonstrate various operations and applications of stack and queue. ➢ Differentiate and evaluate different types of sorting and searching algorithms. ➢ Implement various operations on nonlinear data structure like Tree and Graph also enlist applications. ➢ Execute algorithms using appropriate linear and nonlinear data structures, analyse algorithmic complexities and know their real world applications.
11			Social Science & Engg. Economics **4IT05**	➢ Describe the importance of study of social sciences to Engineers. ➢ Discuss the Composition and Power of Indian Parliament as well as Indian Constitution. ➢ Identify the Impact of Science and Technology on various aspects of human society. ➢ Recognize the nature and scope of Economics to Engineers. ➢ Illustrate all the functions within the Banking Sector and Analyze different factor required for economic planning and development.
12			Comp. Skill Lab.-II **4IT09**	➢ To understand the architecture of Arduino Uno ➢ To apply and execute simplified C program in Arduino microcontroller as well as perform experimental simulation onArduino UNO board. ➢ Students will be able to demonstrate On/Off , Fading effect, scrolling effect using LED with analog and digital input/output. ➢ Student will be able develop and simulate various operations of servo and DC motor.
13	3rd	V	OS **5IT01**	➢ Define a basic concept of operating system and illustrate concept of process management using scheduling algorithm. ➢ Discuss memory management using paging and segmentation ➢ Define file system and free space management. ➢ Illustrate I/O system and disk scheduling. ➢ Tell summary of linux operating system. ➢ Illustrate process scheduling algorithms and memory management techniques.
14			DIC **5IT02**	➢ To understand characteristics of DIC and logic family like TTL,CMOS etc. ➢ Analyze and design logic circuit using minimization techniques ➢ Design combinational logic circuit using universal gates. ➢ Design combinational logic circuit using MSI

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				chip. ➢ Design and analyze synchronous and asynchronous sequential circuit using Flip-flop. ➢ Design and analyze Shift registers and ASM Charts
15			CA&O 5IT03	➢ Understand the basic concept of computer hardware, software, and addressing methods. ➢ Describe the working of multiple bus organization and micro- programmed control. ➢ Explain I/O interfacing, interrupts and direct memory access. ➢ Outline the memory organization of static & dynamic RAMs and its working difference. ➢ Perform arithmetic number representations, Booth's algorithm and design of fast adders and compare different I/O devices.
16			CS 5IT04	➢ Identify the need of communication skill. ➢ Identify strategies for improving communication in social and professional relationship. ➢ Explain and apply the rhetorical goal of persuasive and informative speaking and establish credibility. ➢ Identify and apply strategies for effective communication using technology.
17			ICN 5FEIT05	➢ To understand basic concept of computer network, topologies and physical layer cabling used in networking. ➢ Understand various basic operations of the computer system ➢ Understand operation of OSI layers and various network components and interconnection of LAN. ➢ Understand TCP/IP layers and IPv4 and IPv6 addressing used in networking. ➢ Learn about the router configuration, router fundamentals and its modes. ➢ Use routing protocol for different network applications.
18			IT E & P 5FEIT05	➢ Describes an overview of ethics and, its importance in business and IT ➢ Define computer and internet crime, types of attacks, and security policies. ➢ Describes right of privacy, freedom of expression and issues related with it. ➢ Discuss intellectual property rights, software development and issues related with it. ➢ Discuss employer/employee issues and, whistle blowing situations ➢ Describes impact of IT on the quality of life, professional societies, and code of ethics for professionals.

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19			C-Lab III	➢ Demonstrate LAMP installation and able write scripts in PHP ➢ Prepare different input techniques using forms ➢ Use the concepts of session and cookies ➢ Prepare database and access data through PHP scripts ➢ Prepare content management system
20		VI	POM 6IT01	➢ Learn the basic concept of management and also Study of human resource planning. ➢ Prepare the organization planning, their design and development along with production planning and control. ➢ Do Product design & development ➢ Study fundamental concepts of maintenance and system reliability, concept of failure analysis and Know the concept of TQM, ISO 9000 and quality audit. ➢ Learn about marketing management, pricing and promotion scheme and about sources of finance. ➢ Learn & apply concepts of project management and concepts.
21			DBMS 6IT02	➢ Describe concept of database system. ➢ Discuss and apply the concept related with data model. ➢ Apply concepts of database integrity and security. ➢ Describe query processing and query optimization. ➢ Explain concept of transaction management and properties. ➢ Describe the concept of Concurrency control and study of various database protocols.
22			TOC 6IT03	➢ Construct Finite state machine and differentiate between deterministic finite automation and non-deterministic finite automation. ➢ Construct regular expressions and equivalence between RE and FA. ➢ Design Context free grammar, derivation trees, conversion of Context free grammar in to normal forms, design push down automata ➢ Design Turing machine and its model ➢ Discuss hierarchical structure of various languages and Grammar. ➢ Describe properties of recursive & non-recursive enumerable languages and solve post correspondence problems.
23			CN 6IT04	➢ Understand fundamentals of computer network, network architecture, services offered by OSI reference model. ➢ Discuss design issues of data link layer and elementary data link protocols with protocol verification. ➢ Apply routing methods and congestion control

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				algorithm. ➢ Compare UDP services and TCP services. ➢ Define services of DNS and Multimedia. ➢ Illustrate computer network simulation using fundamentals of computer networks.
24			E-Commerce 6FEIT05	➢ Understand the difference between E-commerce, and E-business and know the Eight unique features of E-commerce technology. ➢ Discuss the concept of various models in E-commerce. ➢ Analyze the Ecommerce infrastructure, design a simple e-commerce Web Site and choose appropriate resources for it. ➢ Analyze Online Security and payment Systems in E-Commerce and Identify the key security threats in the e-commerce environment. ➢ Apply the ecommerce marketing concepts.
25			KM 6FEIT05	➢ State the importance of knowledge and knowledge management ➢ Understand knowledge management, knowledge intensive firms and knowledge workers, learning & KM ➢ Describe Innovation dynamics and knowledge processes, forgetting & unlearning knowledge ➢ Discriminate the influence of socio-cultural factors in motivating workers to participate in knowledge management initiatives and communities of practice ➢ Understand Cross community, Boundary spanning knowledge processes and Power, politics, conflict and knowledge processes ➢ Study ICT & knowledge management, facilitating KM via culture management and HRM practices, Leadership and KM
26			C-Lab IV	➢ Understand Content management System framework. ➢ Differentiate between types of CMS. ➢ Discuss about Configuring templates in Joomla. ➢ Design menus, pages and users with different kinds or levels of permissions in Joomla. ➢ Configure front end modules as Breadcrumbs, Newsflash, Random Image, search and custom HTML.
27	4rth	VII	DSP 7IT01	➢ Classify ASP and DSP system. Demonstrate the knowledge of Analog to Digital and Digital to analog Conversion and DT Signals ➢ Classify and analyze Discrete Time Signals and Linear Time Invariant (LTI) Systems. ➢ Analyze DT LTI systems using Z Transform. Analyze DT LTI systems using Discrete Fourier Transform and Fast Fourier Transform.

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				➢ Design of FIR and IIR Digital Filters using various methods. ➢ Realize FIR and IIR Digital Filters using various implementation structure. ➢ Simulate different DSP concepts and filters using Scilab / Matlab and Analyze results.
28			OOSAD 7IT02	➢ Apply the concept of object oriented Technology for designing software model. ➢ Design class model & state model using unified modelling language. ➢ Formulate the problem statement and design model using Rational Rose. ➢ Use software development life cycle for software model design. ➢ Devise a system into subsystem and find reusable resources. ➢ Analyze and design class model using advanced feature.
29			WT 7It03	➢ Define introduction about Web technologies and express the Markup Languages. ➢ Apply the Style sheet and HTML documents. ➢ Practice the client-side programming, Introduction to Java Script™ and define Document object Model. ➢ Analyze and practice Server-Side Programming and discuss concept of Java Servlets. ➢ Construct java beans as well as develop Java Server pages ➢ Categorize Web Services: WSDL and Analyze Object Data :SOAP ➢ Develop web pages using Servlets, JSP, Markup languages and CSS.
30			RTES 7It04	➢ State the components of Real Time Embedded Systems. ➢ Label the structural units of the Processor and define context switching, deadline and interrupt latency. ➢ Use Programming languages and Data Structures in Embedded Systems. ➢ Design Embedded Systems using Finite State Machines, Petri Net and Data Flow Graph. ➢ Apply the concept of IPC and implement it in Embedded systems environment. ➢ Compare Real Time Operating System & Operating System.
31			PE-I AI & ES 7IT05	➢ Describe Artificial Intelligence and their Problems. ➢ Describe Heuristic Search Techniques that is used for solving Problems come under Artificial Intelligence. ➢ Identify Knowledge Representation issues and Rules. ➢ Discriminate the concept of Symbolic Reasoning under uncertainty. ➢ Explain Natural language Processing, Expert

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32				System and Fuzzy logic System.
			PE-I DDBMS 7IT05	➢ Define distributed data on the networks by using the concept of data communication. ➢ Design DBMS architecture and apply different alternative strategies to deal with the distributed data on the network. ➢ Know the problems, objectives, characteristics of query processing and model the layers of query processing. ➢ Demonstrate distributed concurrency control by applying serializability, locking based concurrency control algorithms and deadlock management. ➢ Identify the failures and fault tolerance in distributed systems and use local reliability protocols for dealing with site failures. ➢ Apply the fundamentals of ODBMS to deal with distributed database on the network.
33			PE-1 M & S 7It05	➢ Identify basic concepts of Systems & models. ➢ Identify and illustrate System Simulation & their types. ➢ Understand System Dynamics and various probability functions. ➢ Illustrate Simulation of Queueing System and Inventory Control. ➢ Formulate & evaluate General Purpose Simulation System Language.
34			DWC 8IT01	➢ Summarize the varies parameters to design efficient digital communication system. ➢ Understand error controlling techniques in digital data transmission ➢ Evaluating the different multiple access schemes and describe the spread spectrum techniques ➢ Explain GSM Network architecture, protocols architecture , call handover, call authentication and security ➢ Know different wireless technology protocols like 802.11,802.15 and 802.16
35			NAS 8IT02	➢ Understand the concept of security and process of standardization. ➢ Identify and apply techniques, approaches and tools used to discover cryptography in information security. ➢ Analyze authentication protocols and process. Know the concept of secure multipurpose mail extension. ➢ Identify how to apply IP Security, its importance and Secure electronic transactions. ➢ Understand basic concepts of Network Management Protocol. Classify Trusted systems and data access controls. ➢ Learn firewalls, password protection, password selection strategies, viruses, Trusted systems, data access control and prevent system vulnerabilities.
36			SE	➢ Understand about Software process & process

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			8IT03	models. ➢ Express software measures, metrics and indicators in process & project domains and Software projects Planning and risks associated with it. ➢ Explain project scheduling and software quality assurance Concepts. ➢ Understand system and product engineering and design principles of system. ➢ Apply various software architecture principles for designing effective user interface. ➢ Understand Software testing fundamentals.
37			PE-II Web Commerce 8It04	➢ Identify basic web commerce concepts and electronic commerce modes. ➢ Identify and illustrate, the approach of secure transport protocol and transition. ➢ Understand electronic cash and electronic payment schemes. ➢ Identify the various security issues and their solutions. ➢ Illustrate the secure email technologies, the internet and website establishment.
38			PE-II CC 8It04	➢ To Describe the basic architecture of cloud computing as well as cloud services, deployment model. Recognized the impact of cloud computing in IT Sector. ➢ Recognize the possible threats in cloud computing services & to implement security mechanism to remove them. ➢ Explore managing proper access control of cloud resources & recognized identity of users & preserve it. ➢ Describe the privacy in cloud computing as well as they will be able to identify the risk in privacy & manage it, also they will be understand the international laws & regulations to maintain privacy. ➢ Describe the Audit & compliance in cloud computing, and recognized control objectives for cloud computing and find regulatory/ external compliance.
39			C-Lab V 8IT07	➢ Understand how to develop problem statement ➢ Able to find out the user requirements. ➢ Identify Use Cases and develop the Use Case model that captures requirements for a software system. ➢ Understand how models help us to visualize a system. ➢ Have a working ability and grasping attitude to design and conduct object-oriented analysis and design experiments using UML, as well as to analyze and evaluate their models.

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Course Outcomes (COs)

Sr. No.	Year	SEM	Subject	CO
1	2nd 2nd	III	Mathematics-III 3IT01	➢ Identify and solve the ordinary differential equation with constant coefficients. ➢ Understand and formulate the Laplace transform to solve Differential equations. ➢ Define Higher order Differential Equations, Z-transform and it's inverse transform. ➢ Define and Formulate Fourier transforms and Partial differential equation of first order. ➢ Discuss Complex analysis and its methods, Understand Vector Calculus and its applications
2			Discrete Structure & Graph Theory 3IT02	➢ Identify basic terminology of Mathematical Logic, Theory of inference & Predicate calculus ➢ Identify, illustrate, and solve engineering problems on the basis of set theory. ➢ Identify and Design an Algebraic Structures and grammer ➢ Examine and formulate the concept of Lattices & Boolean Algebra to solve engineering problems. ➢ Design and interpret graphs and Finite State Machines
3			Object Oriented Programming 3IT03	➢ Explain and apply basic concepts of OOP using Java programming language ➢ Apply and implement OOP concepts like method, constructor and Array. ➢ Apply the OOP principles in programming for solving real life problems. ➢ Demonstrate various file handling input output operations and use of exception handling. ➢ Create Graphical user interface using applet, Java Window toolkit and event handling mechanism. ➢ Design and implement Java application using object oriented programming paradigm.
4			Assembly Language Programming 3IT04	➢ Describe the architecture of 8086/8088 microprocessor and various addressing modes. ➢ Demonstrate various instructions used in data transfer, arithmetic operations in 8086 microprocessor. ➢ Demonstrate various control flow instructions used in 8086. ➢ Demonstrate the concept of stack subroutine

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				and MACROS using various instructions. ➢ Illustrate interrupt types and interfacing of 8086 with programmable peripheral interface 8255 PPI. ➢ Execute various instructions used in 8086.
5			Analog & Digital Electronics **3IT05**	➢ Outline the basic applications of BJT. ➢ Get acquainted with analog ICs like Op-Amp IC-741 and Timer IC-555 ➢ Discriminate the working of sinusoidal and non-sinusoidal waveform generators. ➢ Apply the concept of K-map to simplify logic expressions. ➢ Design and implement combinational & sequential circuits ➢ Test various analog and digital circuits
6			Comp. Skil Lab.-I **3IT09**	➢ Describe the basics of python programming. ➢ Understand the various syntax and looping statement in python ➢ Execute the basic programs using python. ➢ Apply the concept of different data types using program.
7		IV	Computer Organization & Architecture **4IT01**	➢ Describe the basic structure of computer including functional units, addressing modes, stacks, queues, subroutines, etc. ➢ Explain the basic processing unit of computer, execution of a complete instruction. ➢ Describe input/output organization of computer including interrupt, DMA, buses, interfaces, etc. ➢ Explain the concepts of RAM, ROM, cache memory, virtual memory. ➢ Perform computer arithmetic operation.
8			Data Communication & Networking **4IT02**	➢ Understand the principles and fundamental concept of computer networks. ➢ Understand and explain data communication system with its techniques and applications. ➢ Identify various error detection and correction techniques in data transmission. ➢ Evaluating the network addresses and learning routing mechanism protocols. ➢ Design TCP connection and analyze upper OSI layer functions and services. ➢ Explore the network design and its applications to digital world.
9			Operating System **4IT03**	➢ Fundamental understanding of the role of Operating Systems, concept of a process and thread. ➢ To apply the concept of process scheduling and concurrency control to different scenarios. ➢ To understand and apply the concept deadlock and basic Memory Management ➢ To realize virtual memory management schemes.

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				➢ To realize the concept of File system management. ➢ Apply the concept of process scheduling, page replacement and memory management techniques.
10			Data Structures **4IT04**	➢ Recognize various data structures, their memory management and illustrate algorithms using array. ➢ Demonstrate various operations on linked list using dynamic memory allocation. ➢ Demonstrate various operations and applications of stack and queue. ➢ Differentiate and evaluate different types of sorting and searching algorithms. ➢ Implement various operations on nonlinear data structure like Tree and Graph also enlist applications. ➢ Execute algorithms using appropriate linear and nonlinear data structures, analyse algorithmic complexities and know their real world applications.
11			Social Science & Engg. Economics **4IT05**	➢ Describe the importance of study of social sciences to Engineers. ➢ Discuss the Composition and Power of Indian Parliament as well as Indian Constitution. ➢ Identify the Impact of Science and Technology on various aspects of human society. ➢ Recognize the nature and scope of Economics to Engineers. ➢ Illustrate all the functions within the Banking Sector and Analyze different factor required for economic planning and development.
12			Comp. Skill Lab.-II **4IT09**	➢ To understand the architecture of Arduino Uno ➢ To apply and execute simplified C program in Arduino microcontroller as well as perform experimental simulation onArduino UNO board. ➢ Students will be able to demonstrate On/Off , Fading effect, scrolling effect using LED with analog and digital input/output. ➢ Student will be able develop and simulate various operations of servo and DC motor.
13	3rd	V	Database Management Systems **5IT01**	➢ Identify role of database system, find out its applications and learn about database file systems. ➢ Describe the concept related with data model and transaction management with its properties. ➢ Describe and apply the concept of database commands and operations.

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				➢ Explain the concept of concurrency control and various type of protocol. ➢ Explain the concept of Database security and authorization. ➢ Describe advanced concept of database like distributed database, Logical database, Web database.
14			Theory of Computation **5IT02**	➢ Construct finite state machines to solve problems in computing. ➢ Write regular expressions and equivalence between RE and FA. ➢ Construct and apply well defined rules for parsing techniques in compiler. ➢ Construct and analyse Push down automata, Turing machine and its model for formal languages. ➢ Express understanding of Chomsky hierarchy, decidability and undecidability problems.
15			Software Engineering **5IT03**	➢ Identify unique features of various software application domains and classify software applications. ➢ Analyze software requirements by applying various modeling techniques. ➢ Choose and apply appropriate project planning, execution, tracking and auditing techniques for software development. ➢ Describe principles of agile development, discuss the SCRUM process and distinguish agile process model from other process models. ➢ Analyze software architecture, software designs and software testing fundamentals for software development. ➢ Implement IT project management through life cycle of the project and future trends in IT Project Management.
16			**PE-I** (i) Information Security Systems **5IT04**	➢ Study the foundational theory behind information security. ➢ Discuss the basic information security. ➢ Illustrate the legal, ethical and professional issues. ➢ Discuss the aspects of risk management. ➢ Summarize various standards for information security. ➢ Explain the security techniques.
17			**PE-I** (ii) Data Science & Statistics **5IT04**	➢ Gain knowledge about basic concepts of Data Science & Statistics. ➢ Demonstrate proficiency with statistical analysis of data.

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				➢ Analyze statistical data graphically using frequency distributions and cumulative frequency distributions. ➢ Develop the ability to build and assess data-based models. ➢ Evaluate models generated from data
18			**PE-I** (iii) Internet of Things **5IT04**	➢ Understand the importance of IOT device ➢ Identify the IOT networking components with respect to OSI layers. ➢ Understand the IOT technology Architecture and standards ➢ Design IOT application in different domain and analyze their performance ➢ Implement basic IOT application on embedded system. ➢ Apply IOT data for business solution in various domain in secured manner
19			**OE-I** **(i)** Soft Skills & Interpersonal Communication 5IT05	➢ Use and apply interaction skills ➢ Use and apply leadership skills ➢ Use and apply negations skills.
20			**OE-I** (ii)Cyber Law & Ethics 5IT05	➢ Understand Cyber laws ➢ Describe Information Technology act and Related Legislation ➢ Demonstrate Electronic business and legal issues ➢ Illustrate/Interpret Cyber Ethics ➢ Understand the significance and need of Cyber Ethics ➢
21			Comp. Skill Lab.-III 5IT09	➢ Design a Web page using basic tags of HTML and CSS. ➢ Insert Java script in HTML web pages. ➢ Understand the basic concepts of type script. ➢ Create and design data binding in angular components.
22		**VI**	Compiler Design **6IT01**	➢ Describe the fundamentals of compiler and various phases of compilers. ➢ Design and implement LL and LR parsers ➢ Solve the various parsing techniques like SLR, CLR, LALR ➢ Differentiate and evaluate different types of sorting and searching algorithms. ➢ Examine the concept of Syntax-Directed Definition and translation. ➢ Assess the concept of Intermediate Code Generation and run-time environment
21			Design & Analysis of Algorithms **6IT02**	➢ Analyse worst-case running times of algorithms using asymptotic analysis. ➢ Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it.

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				➢ Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. ➢ Describe the greedy paradigm and explain when an algorithmic design situation calls for it. ➢ Understand the concept of Backtracking and Combinational Search. ➢ Identify worst and average case behavior of Polynomial Time & Non Polynomial Time Algorithms.
22			Artificial Intelligence **6IT03**	➢ Define Artificial Intelligence and identify problems for which solution by AI methods can be devised. ➢ Evaluate of different uninformed search algorithms on well formulate problems along with stating valid conclusions that the evaluation supports. ➢ Design and Analysis of informed search algorithms on well formulated problems. ➢ Formulate and solve given problem using Propositional and First order logic. ➢ Apply reasoning for non-monotonic AI problems. ➢ Have a basic understanding of some of the more advanced topics of AI such as Learning, Understanding, Natural Language Processing.
23			**PE-II** (i) Cryptography & Network Security **6IT04**	➢ Understand the principles and fundamental concept of Cryptography & Network Security. ➢ To learn Encryption and Decryption Techniques. ➢ Evaluate various Key Encryption Algorithms. ➢ Understand IP Security system and protocols. ➢ Identify and understand Network Security controls. ➢ Explore web and system security and its applications to digital world.
24			**PE-II** (ii) Big Data Analytics **6IT04**	➢ Understand the key issues in big data management and its associated applications in intelligent business and scientific computing. ➢ Acquire fundamental enabling techniques like Hadoop and NoSQL in big data analytics. ➢ Achieve basic knowledge and operations of Map-Reduce

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				➢ Interpret data stream management system and various techniques used for stream processing. ➢ Summarize different data mining algorithms and applications of big data analytics. ➢ Demonstrate various concepts of data analytics using R.
			PE-II (iii) sensors & Activators **6IT04**	➢ Concept behind working of measurement systems and different types of sensors and actuators. ➢ Understanding of electric and magnetic sensors and actuators and their applications. ➢ Understanding of optical sensors and other sensors and their applications. ➢ Understanding of smart sensors and their uses.
25			**OE-II** **ECONOMIC POLICY IN INDIA** **6IT05**	➢ Student will be able to explain, elaborate and indentify the impact of external sector on Indian economy ➢ Student will be able to explain, elaborate and indentify the impact monetary and fiscal policies in India ➢ Student will be able to explain ,elaborate and analyze the issues of Indian economy.
			OE-II **HUMAN RESOURCE DEVELOPMENT & ORGANIZATION BEHAVIOR** **6IT05**	➢ To have an understanding of the basic concepts, functions and processes of human resource management ➢ To be aware of the role, functions and functioning of human resource department of the organizations. ➢ To Design and formulate variours HRM processes such as Recruitment, Selection, Training, Development, ➢ Performance appraisals and r Reward Systems, Compensarion Plans and Ethical Behaviour. ➢ Develop ways in which human resources management might diagnose a business strategy and then facilitate the internal change necessary to accomplish the strategy. ➢ Evaluate the developing role of human resources in the global arena.
			OE-II **INTELLECTUAL PROPERTY RIGHT6IT05**	➢ Demonstrate a breadth of knowledge in Intellectual property. ➢ Assess fundamental aspects of Intellectual Property Rights. ➢ Evaluate Patents, Searching, filling and drafting

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				of Patents ➢ Discuss the basic principles of geographical indication, industrial designs, and copyright. ➢ Explain of Trade Mark and Trade Secret and Investigate current trends in IPR and Government initiatives in fostering IPR.
26			Comp. Skill Lab.-IV	➢ Identify requirement from problem statement ➢ Design UML modules ➢ Estimate test coverage matrix and structural complexity ➢ Design test suits
27	4rth	VII	**Digital Signal Processing 7IT01**	➢ Classify ASP and DSP system. Demonstrate the knowledge of Analog to Digital and Digital to analog Conversion and DT Signals ➢ Classify and analyze Discrete Time Signals and Linear Time Invariant (LTI) Systems. ➢ Analyze DT LTI systems using Z Transform. Analyze DT LTI systems using Discrete Fourier Transform and Fast Fourier Transform. ➢ Design of FIR and IIR Digital Filters using various methods. ➢ Realize FIR and IIR Digital Filters using various implementation structure. ➢ Simulate different DSP concepts and filters using Scilab / Matlab and Analyze results.
28			**Object Oriented System Analysis & Design 7IT02**	➢ Apply the concept of object oriented Technology for designing software model. ➢ Design class model & state model using unified modelling language. ➢ Formulate the problem statement and design model using Rational Rose. ➢ Use software development life cycle for software model design. ➢ Devise a system into subsystem and find reusable resources. ➢ Analyze and design class model using advanced feature.
29			**Web Technology 7It03**	➢ Define introduction about Web technologies and express the Markup Languages. ➢ Apply the Style sheet and HTML documents. ➢ Practice the client-side programming, Introduction to Java Script ™ and define Document object Model. ➢ Analyze and practice Server-Side Programming and discuss concept of Java Servlets. ➢ Construct java beans as well as develop Java Server pages ➢ Categorize Web Services: WSDL and Analyze Object Data :SOAP ➢ Develop web pages using Servlets, JSP, Markup

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				languages and CSS.
30			Real Time Embedded Systems 7It04	➢ State the components of Real Time Embedded Systems. ➢ Label the structural units of the Processor and define context switching, deadline and interrupt latency. ➢ Use Programming languages and Data Structures in Embedded Systems. ➢ Design Embedded Systems using Finite State Machines, Petri Net and Data Flow Graph. ➢ Apply the concept of IPC and implement it in Embedded systems environment. ➢ Compare Real Time Operating System & Operating System.
31			PE-I (iii)Artificial Intelligence & Expert Systems 7IT05	➢ Describe Artificial Intelligence and their Problems. ➢ Describe Heuristic Search Techniques that is used for solving Problems come under Artificial Intelligence. ➢ Identify Knowledge Representation issues and Rules. ➢ Discriminate the concept of Symbolic Reasoning under uncertainty. ➢ Explain Natural language Processing, Expert System and Fuzzy logic System.
32			PE-I (i) Distributed DBMS 7IT05	➢ Define distributed data on the networks by using the concept of data communication. ➢ Design DBMS architecture and apply different alternative strategies to deal with the distributed data on the network. ➢ Know the problems, objectives, characteristics of query processing and model the layers of query processing. ➢ Demonstrate distributed concurrency control by applying serializability, locking based concurrency control algorithms and deadlock management. ➢ Identify the failures and fault tolerance in distributed systems and use local reliability protocols for dealing with site failures. ➢ Apply the fundamentals of ODBMS to deal with distributed database on the network.
33			PE-1 (ii) Modelling & Simulation 7It05	➢ Identify basic concepts of Systems & models. ➢ Identify and illustrate System Simulation & their types. ➢ Understand System Dynamics and various probability functions. ➢ Illustrate Simulation of Queueing System and Inventory Control. ➢ Formulate & evaluate General Purpose Simulation System Language.
34			Digital &	➢ Summarize the varies parameters to design

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			Wireless Communication 8IT01	efficient digital communication system. ➢ Understand error controlling techniques in digital data transmission ➢ Evaluating the different multiple access schemes and describe the spread spectrum techniques ➢ Explain GSM Network architecture, protocols architecture , call handover, call authentication and security ➢ Know different wireless technology protocols like 802.11,802.15 and 802.16
35			Network Administration & Security 8IT02	➢ Understand the concept of security and process of standardization. ➢ Identify and apply techniques, approaches and tools used to discover cryptography in information security. ➢ Analyze authentication protocols and process. Know the concept of secure multipurpose mail extension. ➢ Identify how to apply IP Security, its importance and Secure electronic transactions. ➢ Understand basic concepts of Network Management Protocol. Classify Trusted systems and data access controls. ➢ Learn firewalls, password protection, password selection strategies, viruses, Trusted systems, data access control and prevent system vulnerabilities.
36			Software Engineering 8IT03	➢ Understand about Software process & process models. ➢ Express software measures, metrics and indicators in process & project domains and Software projects Planning and risks associated with it. ➢ Explain project scheduling and software quality assurance Concepts. ➢ Understand system and product engineering and design principles of system. ➢ Apply various software architecture principles for designing effective user interface. ➢ Understand Software testing fundamentals.
37			PE-II Web Commerce 8It04	➢ Identify basic web commerce concepts and electronic commerce modes. ➢ Identify and illustrate, the approach of secure transport protocol and transition. ➢ Understand electronic cash and electronic payment schemes. ➢ Identify the various security issues and their solutions. ➢ Illustrate the secure email technologies, the internet and website establishment.
38			PE-II Cloud Computing 8It04	➢ To Describe the basic architecture of cloud computing as well as cloud services, deployment, model. Recognized the impact of cloud computing in IT Sector. ➢ Recognize the possible threats in cloud computing services & to implement security mechanism to

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				remove them. ➢ Explore managing proper access control of cloud resources & recognized identity of users & preserve it. ➢ Describe the privacy in cloud computing as well as they will be able to identify the risk in privacy & manage it, also they will be understand the international laws & regulations to maintain privacy. ➢ Describe the Audit & compliance in cloud computing, and recognized control objectives for cloud computing and find regulatory/ external compliance.
39			C-Lab V 8IT07	➢ Understand how to develop problem statement ➢ Able to find out the user requirements. ➢ Identify Use Cases and develop the Use Case model that captures requirements for a software system. ➢ Understand how models help us to visualize a system. ➢ Have a working ability and grasping attitude to design and conduct object-oriented analysis and design experiments using UML, as well as to analyze and evaluate their models.

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Course Outcomes (2017-18)
III Semester

Course Name:(3ET01)Engineering Mathematic-III

At the end of course, Student will be able to:

Course Outcomes:	
17COE301.1	1. Apply the knowledge of vector calculus to solve physical problem and find Fourier, sine,cosine transform
17COE301.2	2. Determine analytical function, Taylor's and Laurent's series
17COE301.3	3. Solve polynomial equations, system of linear equations and differential equations by differet methods.
17COE301.4	4. Make a use of various methods to solve Linear differential equations
17COE301.5	5. Solve partial differential equation and difference equation
17COE301.6	6. Evaluate laplace transform by making use of properties and solution of differential equatons by laplace transform methods.

Course Name:Object Oriented Programming (3ET2)& Object Oriented Programming Lab (3ETP7)

At the end of course, Student will be able to:

Course Outcomes:	
17COE302.1	1. To Justify the basic concept of object-oriented programming.
17COE302.2	2. To Design, implement, test and debug simple programs in C++ using
17COE302.3	3. To Understand polymorphisam in OOP using C++.
17COE302.4	4. To Understand and Implement Inheritance using C++.
17COE302.5	5. To Design and To implement simple programs in Java using Classes, Objects and Inheritance.
17COE302.6	6. To Design and test the implementation of Object Oriented programming concepts.

Course Name:Electronic Devices & Circuits (3ET3) & Electronic Devices & Circuits Lab (3ETPP8)

At the end of course, Student will be able to:

Course Outcomes:	
17COE302.1	1. Comprehend the knowledge of diode and its applications in rectifier and
17COE302.2	2. Analyze the RC circuit using different input signals, Understant Diode
17COE302.3	3. Understand basic of BJT and their operational parameters
17COE302.4	4. Understand feedback concept, topologies and their applications
17COE302.5	5. Comprehend the knowledge of Multistage amplifiers and Field Effect
17COE302.6	6. Implement and analyze Electronic and wave shaping circuits

Course Name: (3ET4)Instrumentation & Sensor

At the end of course, Student will be able to:

Course Outcomes:	
17COE404.1	1. To Comprehend fundamental knowledge of transducers, instrumentation and measurement systems.
17COE404.2	2. To Understand working principle and design of Displacement, Liquid Level measurement.
17COE404.3	3. To Understand working principle and design of Temperature, Pressure, Flow and Humidity measurement.
17COE404.4	4. To Understand working principle of Velocity, Strain measurement
17COE404.5	5. To impart the knowledge of Data acquisition and applications of Electronic Instruments Analog & Digital data acquisition system

Course Name: (3ET5) Electromagnetic Wave

At the end of course, Student will be able to:

Course Outcomes:	
17COE305.1	1. Apply vector calculus to understand the behavior of static electric and
17COE305.2	2.Formulate and solve problems in electrostatics and magnetostatics in dielectric
17COE305.3	3. Describe and analyze electromagnetic wave propagation in free-space.
17COE305.4	4. Analyze plane electromagnetic waves at boundaries between homogeneous
17COE305.5	5. Analyze the electromagnetic radiation from localized charges considering

Course Name: (3ETP9)Skill Development Lab-I (Measurements, Testing & Instrumentation)

At the end of course, Student will be able to:

Course Outcomes:	
17COE309.1	1. To understand different types of electronic testing and measuring equipments.
17COE309.2	2. To understand use of various signal/function generators and analyzers used in electronics measurements
17COE309.3	3. To understand use of various Oscilloscope and Analyzers used in electronics measurement system.

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Course Outcomes (2017-18)
IV Semester

Course Name: Signals and System (4ET01)
At the end of course, Student will be able to:

Course Outcomes:	
18COE401.1	1. Describe signals mathematically and understand how to perform mathematical
18COE401.2	2. Analyze the spectral characteristics of continuous-time periodic and aperiodic
18COE401.3	3. Classify systems based on their properties and determine the response of LTI
18COE401.4	4. Analyze system properties based on impulse response and Fourier analysis.
18COE401.5	5. Understand the process of sampling and its effects. and Apply the Laplace

Course Name: Network Analysis (4ET2)
At the end of course, Student will be able to:

Course Outcomes:	
18COE403.1	1. Analyze electrical circuits using mesh and node analysis.
18COE403.2	2. Analyze electrical circuits using suitable network theorems.
18COE403.3	3. Draw oriented graph of the network to determine their currents and voltages.
18COE403.4	4. Apply Laplace Transform for circuit analysis.
18COE403.5	5. Relate various two port network and apply two-port network theory for

Course Name: Analog Electronics I (4ET3)& Analog Electronics I Lab (4ETP7)
At the end of course, Student will be able to:

Course Outcomes:	
18COE403.1	1. Analyze different wave shaping circuits.
18COE403.2	2. Perform evaluation of the switching behavior of semiconductor devices.
18COE403.3	3. Comprehend the knowledge of basic concepts and performance parameters of
18COE403.4	4. Use Op-Amp for implementation of linear applications
18COE403.5	5. Comprehend the knowledge of non-linear applications of Op-Amp, PLL and
18COE403.6	6. Implement wave shaping circuits & various applications of Op-Amp

Course Name: Digital Electronics I (4ET4) & Digital Electronics I Lab (4ETP8)
At the end of course, Student will be able to:

Course Outcomes:	
18COE404.1	1. Apply Boolean Algebra and number systems to solve logic functions and
18COE404.2	2.Simplify combinational logic ckt using K-map.
18COE404.3	3.To design MSI ckts using 74/54 series chips.
18COE404.4	4.Analyze and design sequential circuits.
18COE404.5	5.Analyze clocked sequential networks and study different types of
18COE404.6	6.Design and Implement SSI,MSI,LSI,combinational and sequential logic

Course Name:Communication Engineering - I (4ET5) & Communication Engineering - I Lab (4ETP9)
At the end of course, Student will be able to:

Course Outcomes:	
18COE405.1	1. Understand the concept of Amplitude Modulation including its frequency

18COE405.2	2.Comprehend the AM Receivers and various Demodulation schemes in analog
18COE405.3	3. Comprehend the concept of Frequency Modulation system and compare it
18COE405.4	4. Understand FM receivers along with impact of noise in FM reception
18COE405.5	5. Differentiate between parallel & co-axial transmission line and the properties
18COE405.6	6. Explain principle of antennas, radiation and to study various antennas used at

Course Name:Skill Development Lab-II (Software) (4ETP10)

At the end of course, Student will be able to:

Course Outcomes:	
18COE410.1	1. Design & Develop simple web based applications on their own.
18COE410.2	2. Design and develop applications by using Java Scripting.
18COE410.3	3. Identify existing processes/solution methods for solving the problem,

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Course Outcomes

V Semester (2017-18)

Course Number and Title: Electronic Devices and Circuits-II and Lab (5XT1/5XT7)

Upon successful completion of this course, students will be able to:

17COE501.1	Analyze effect of parasitic R, L & C on switching circuits, derive mathematical expressions & analyze RC & RL circuits as low pass & high pass filters and derive mathematical expressions & analyze diodes & switching transistors based Clipping and Clamping circuits.
17COE 501.2	Analyze switching characteristics of Diode, BJT, JFET & CMOS; switching speed of Schottky diode and transistor and illustrate various Logic gates.
17COE501.3	Explain collector coupled Bi-stable, Mono-stable & astable multi-vibrators, time based generators, Sweep generators; demonstrate the knowledge of number system & Boolean algebra and build adder, subtractors & gray codes.
17COE501.4	Illustrate & analyze TTL, RTL, IIL, DTL, HTL, ECL & CMOS digital logic families along with their characteristics, understand the concept of Tristate logic and demonstrate the knowledge of IC 54XX/74XX series.
17COE501.5	Demonstrate the knowledge of SR, JK, MSJK, D and T flip flops, build counters & registers applications using flip flops; explain various A/D & D/A conversion techniques and build **adders and subtractors using logic gates.**
17COE501.6	Understand various types of semiconductor & sequential memories.

Course Number and Title: Power Electronics (5XT2)

Upon completion of this course, students will able to understand the following:

17COE502.1	Understand the Construction, characteristics & application of different power devices
17COE 502.2	Understand the importance of Series & parallel combination of SCR in a circuit ,problems associated with it and it's protection circuits.
17COE502.3	Describe basic operation & Derive the output voltage and current of phase controlled rectifiers with & without RL load.
17COE502.4	Analyze various types of inverter circuits & various commutation techniques.
17COE502.5	Able to understand the basic principle,types & control techniques of chopper & cycloconverter
17COE502.6	Designing of circuit for special applications using power devices.

Course Number and Title: **Control system engineering (5XT03)**

Upon completion of this course, students will be able to

17COE503.1	To construct mathematical model and derive transfer function for close loop system using different techniques like Signal Flow Graph, Block diagram reduction technique, Mechanical to electrical analogy.
17COE 503.2	Apply Time domain analysis for finding impulse response of first, second & higher order systems and analyze performance parameters like steady state error, error constants and dynamic error coefficients.
17COE503.3	Apply Laplace transform for time domain analysis so as to verify the stability of the system with the help of different approaches like Routh Hurwitz's criterion and Root locus technique.
17COE503.4	Apply frequency domain analysis to verify the stability of system using Bode plot, Polar plot, Nyquist plot and to understand relative stability.
17COE503.5	Translate transfer function to state space variable model and vice versa and observe controllability and observability of systems using State Space representation.
17COE503.6	Apply Z- transform for finding response and to analyze stability of discrete time system and to demonstrate digital controller & its transfer functions.

Course Number & Title: **Communication Engineering II (5XT4/5XT9)**

Upon completion of this course, students will be able to-

17COE504.1	Understand the need of different modulation Techniques and demonstrate the knowledge of principles of different modulation techniques
17COE504.2	Illustrate TRF & Super Heterodyne Receivers along with details of each block, AGC, communication receivers and derive mathematical expression for determining the SNR of DSB-FC, DSB-SC & SSB-SC systems.
17COE504.3	Explain various direct & indirect FM generation techniques and importance of pre-emphasis & de-emphasis in FM system.
17COE504.4	demonstrate the knowledge of various AGC, AFC and FM detector, stereo FM receivers and analyze impact of noise in FM reception including threshold effect.
17COE504.5	Understand the concept of sampling, quantization, interpret aliasing and aperture effect, build reconstruction filter, illustrate the concept of TDM and demonstrate the knowledge of PAM, PWM, PPM, PCM, DM & ADM with the help of block diagrams.
17COE504.6	Understand concept of pulse dialing & touch tone dialing in telephones, demonstrate the knowledge different switching techniques and illustrate basic EPABX system.

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Course Outcomes

VI Semester (2017-18)

Course Number and Title: Digital Integrated Circuits (6XT1/6XT6)

Upon completion of this course, students will be able to :

17COE601.1	Demonstrate use of binary algebra & standard logical functions and design combinational logic circuits using different minimization techniques along with synthesis using AND-OR gates.
17COE601.2	Design of combinational logic circuits using 74XX/54XX series MSI chips.
17COE601.3	Design combinational logic circuits using commercially available LSI chips like ROM, PLA, PAL & FPGAs.
17COE601.4	Design & analyze sequential synchronous logic circuits using appropriate state minimization techniques.
17COE601.5	Design & analyze asynchronous sequential logic circuits using appropriate state minimization techniques along with detection of hazards in combinational & sequential logic circuits
17COE601.6	Apply different methods for fault detection and location in combinational & sequential logic circuits.

Course Number and Title: Linear Integrated Circuits (6XT2/6XT6)

Upon completion of this course, students will be able to :

17COE602.1	Understand internal circuit of Ideal OP-AMP along with its characteristics and to measure its associated parameters.
17COE602.2	Build linear applications using OP-AMP inverting and non-inverting mode along with its mathematical analysis.
17COE602.3	Build non-linear applications using OP-AMP along with its mathematical analysis.
17COE602.4	Build active filters and amplifiers using OP-AMP. To understand Internal circuit of IC 555 and to build various applications using IC555.
17COE602.5	Design voltage Regulator using IC723, IC78XX, IC79XX & LM317 for various applications.
17COE602.6	Understand operation and transfer characteristics of IC565 & to build various applications using phase locked loop. To understand functions of IC8038.

Course Number and Title: Introduction to Microprocessors and Lab(6XT3/6XT7)

Upon completion of this course, students will be able to:

17COE603.1	Illustrate Architecture , register structure, addressing modes and instruction set of 8085 along with sketching of timing diagrams.
17COE603.2	Explain assemblers, Simulators, Stack, Subroutine, Address space partitioning schemes and build Assembly Language Programs using 8085.
17COE603.3	Demonstrate various Interrupt system of 8085 & Data transfer schemes and Build suitable applications using SOD, SID and USART 8251 through interfacing.
17COE603.4	Experiment with interfacing of PPI, Timer/Counter, DMA with 8085 and Build suitable application with interfacing.
17COE603.5	Illustrate Architecture, internal operations, Addressing modes, instruction formats and Execution timing of 8086.
17COE603.6	Explain Instruction set of 8086, Assembly Directives, Operators and Build simple Assembly language programs using 8086.

Course Number and Title: Digital Communication (6XT4/6XT8)

Upon completion of this course, students will be able to:

17COE604.1	Demonstrate the knowledge of fundamental building blocks of digital communication systems ,different types of codes, PSD,scrambler and un-scrambler.
17COE604.2	Demonstrate the knowledge of fundamentals of information theory and different types of entropy and illustrate the concept of Shannon's channel capacity & importance of SNR to Bandwidth trade-off.
17COE604.3	Illustrate generation & reception of digital modulation techniquesand derive mathematical relationships to determine probability of error for these modulation schemes.
17COE604.4	Explain Inter-symbol interference (ISI) and illustrate various correlative encoders & decoders along with their merits & demerits, equalization,various types of equalizers, clock synchronization & carrier synchronization and design transversal equalizer up to 5-taps
17COE604.5	Demonstrate the knowledge of types of errors & error control methods, and illustrate code tree & code trellis for convolution codes
17COE604.6	Explain the fundamentals of Multiple access techniques and design PN sequence generator, demonstrate the knowledge of DSSS and FHSS and derive mathematical expression to relate these spread spectrum performance parameters.

Course Number and Title: Introduction to Microprocessors and Lab(6XT3/6XT7)

Upon completion of this course, students will be able to:

17COE603.1	Illustrate Architecture , register structure, addressing modes and instruction set of 8085 along with sketching of timing diagrams.
17COE603.2	Explain assemblers, Simulators, Stack, Subroutine. Address space partitioning schemes and build Assembly Language Programs using 8085.
17COE603.3	Demonstrate various Interrupt system of 8085 & Data transfer schemes and Build suitable applications using SOD, SID and USART 8251 through interfacing.
17COE603.4	Experiment with interfacing of PPI, Timer/Counter, DMA with 8085 and Build suitable application with interfacing.
17COE603.5	Illustrate Architecture, internal operations, Addressing modes, instruction formats and Execution timing of 8086.
17COE603.6	Explain Instruction set of 8086, Assembly Directives, Operators and Build simple Assembly language programs using 8086.

Course Number and Title: Digital Communication (6XT4/6XT8)

Upon completion of this course, students will be able to:

17COE604.1	Demonstrate the knowledge of fundamental building blocks of digital communication systems ,different types of codes, PSD,scrambler and un-scrambler.
17COE604.2	Demonstrate the knowledge of fundamentals of information theory and different types of entropy and illustrate the concept of Shannon's channel capacity & importance of SNR to Bandwidth trade-off.
17COE604.3	Illustrate generation & reception of digital modulation techniquesand derive mathematical relationships to determine probability of error for these modulation schemes.
17COE604.4	Explain Inter-symbol interference (ISI) and illustrate various correlative encoders & decoders along with their merits & demerits, equalization,various types of equalizers, clock synchronization & carrier synchronization and design transversal equalizer up to 5-taps
17COE604.5	Demonstrate the knowledge of types of errors & error control methods, and illustrate code tree & code trellis for convolution codes
17COE604.6	Explain the fundamentals of Multiple access techniques and design PN sequence generator, demonstrate the knowledge of DSSS and FHSS and derive mathematical expression to relate these spread spectrum performance parameters.

Course Number and Title: Communication skills (6XT6/6XT10)

Upon completion of this course, students will be able to:

17COE606.1	Communicate ideas effectively both orally and in written form.
17COE606.2	Apply communication skills to write specification requirements, & safety cases as a part of technical writing.
17COE606.3	Demonstrate the knowledge of effective formal and informal oral presentation.
17COE606.4	Comprehend, monitor & evaluate technical reports and proposals.
17COE606.5	Participate confidently in group discussions, interviews, seminars & conferences.
17COE606.6	Engage at some level, the ideas on effective cooperative working and group learning.

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Course Outcomes (2017-18)

VII Semester

Course Name: DCN (7XT1)

At the end of course, Student will be able to:

17COE701.1	Identify different types of network devices and their functions within a network.
17COE 701.2	Describe different types of network topologies and protocols.
17COE701.3	Differentiate the layers of the OSI and TCP/IP model.
17COE701.4	Understand various types of routing algorithms and concepts of IP addresses.
17COE701.5	Understand and Describe various Application Layer Protocols.
17COE701.6	Deal with security issues in data network.

Course Name: MCA (7XT2)

At the end of course, Student will be able to:

17COE702.1	1. To understand the 8051 Architecture and serial/parallel bus standards
17COE702.2	2. To understand the instructions set of AVR Microcontroller.
17COE702.3	3. To analyze ADCs, DACs, sensors & develop logic in programming of 8051
17COE702.4	4. To understand interfacing and programming of peripherals with 8051 and design various systems using it.
17COE702.5	5. To study basics of serial communication ,Real time clock and its programming and 8051 C-programming.
17COE702.6	6. Develop assembly language programs for arithmetic, logical operations in 8051 and interfacing of 8051 with various peripherals.

Course Name: DSP (7XT3)

At the end of course, Student will be able to:

17COE703.1	1. Examine the discrete time signals and identify the type system.
17COE701.2	2. Solve the z-transform of a sequence, identify its region of convergence, and compute the inverse z-transform.
17COE701.3	3. Evaluate the Fourier transform of a signal.
17COE701.4	4. Design FIR and IIR filters.
17COE701.5	5.Discuss the concepts of Multirate Digital Signal Processing and need of Filter banks, architecture of DSP processor TMS320C54XX.
17COE701.6	6.Generate different plots and explore results to draw valid conclusions and inferences in DSP problems.

Course Name: PE-I(VLSI Design) (7XT4)

At the end of course, Student will be able to:

17COE704.1	1. Demonstrate the knowledge of need of VLSI design & its importance in various applications. Illustrate IC manufacturing process & CMOS Technology, various IC design pa rameters and explain various tools for IC design
17COE704.2	2. Explain different aspects of VHDL for VLSI design, understand & differentiate between the various VHDL modeling techniques and model combinational & sequential circuits using VHDL.
17COE704.3	3.Demonstrate the knowledge of concepts such as simulation, synthesis & realization of digital circuits using VHDL and related to various HDLs.
17COE704.3	4. Illustrate the architecture of CPLD & FPGA, understand Xilinx/ Altera as tool for CPLD & FPGA design and apply these techniques for digital circuit designing
17COE704.4	5.Explain various CMOS logic families, build digital circuits using these families and compare them related to their speed, area and power consumption. Illustrate the process of fabrication of MOS transistors, apply the design rules for designing CMOS layouts and perform case study of ALU/Sequence detector.

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Department of Electronics & Telecommunication Engineering

Course Outcomes (2017-18)

VIII SEM

Course Name: UHF &M (8XT1)

At the end of course, Student will be able to:

17COE801.1	1. Understand the operation and analysis of microwave tubes.
17COE801.2	2. Understand principle of operation and analysis of solid state microwave devices.
17COE801.3	3. Describe the the principles of microwave transmission through Waveguides and microstrip lines with their analysis.
17COE801.4	4. Comprehend the knowledge transmission line, cavity and dielectric Microwave resonators
17COE801.5	5. Understand and principle of operation of microwave components with formulation of scaterring matrix and measurement techniques for microwave parameters
17COE801.6	6.Implement the methods of measurement of microwave parameters in the laboratory and analyse results.

Course Name: ECD (8XT2)At the end of course, Student will be able to:

17COE802.1	1. Understand analog circuit design and its applications such as design of voltage regulator and various opamp based circuits such as comparator, window detector scaling and summing amplifier.
17COE802.2	2. Design of waveform generator circuit using IC741, IC8038, IC655. Understand the working and design of first and second order filters
17COE802.3	3.Demonstrate the knowledge of concepts such as simulation, synthesis & realization of digital circuits using VHDL and related to various HDLs.
17COE802.4	4. Enplain the different aspects of CMOS circuit in VLSI design. undurstand the basic physical design of simple logic gates
17COE802.5	5. understand the VLSI design flow, demonstrate various VHDL coding styles to describe the digial system. design combinational and sequential circuits
18COE802.6	6. Verify the operation of linear voltage regulator, analyze the performance of various analog circuits, implement CMOS ckts using tool like Xilinx, Mixrowind etc.

Course Name: WCOMM (8XT3)

At the end of course, Student will be able to:

17COE803.1	1. Perform evaluation of the switching behavior of semiconductor devices
17COE803.2	2. Comprehend the knowledge of basic concepts and performance parameters of Op-Amp.
17COE803.3	3. Use Op-Amp for implementation of linear applications.
17COE803.4	4. Use Op-Amp for implementation of non-linear applications.
17COE803.5	5. Comprehend the knowledge of data converter and PLL & its applications

Course Name: PE-II(BM) (8XT4)

At the end of course, Student will be able to:

17COE804.1	1.Undersatnd fundametals of Medical Instrustrumentation,Biomedical Signals and Electrodes
17COE804.2	2.Illustrate the significance of human signals and recording techniques
17COE804.3	3.Familiarize with Modern medical imaging systems.
17COE804.4	4.Describe Need of Physiological and electrotherapy equipments
17COE804.5	5.Conceptualize requirements and importance of Patient care,Monitoring,Safety and Computers in Biomedical Engineering.

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Prof Ram Meghe Institute of Technology & Research, Badnera-Amravati
Department of Electronics & Telecommunication Engineering
Course Outcomes
III Semester

Course Name:(3ET01)Engineering Mathematic-III
At the end of course, Student will be able to:

Course Outcomes:	
19COE301.1	1. Apply the knowledge of vector calculus to solve physical problem and find Fourier, sine,
19COE301.2	2. Determine analytical function, Taylor's and Laurent's series
19COE301.3	3. Solve polynomial equations, system of linear equations and differential equations by differet methods.
19COE301.4	4. Make a use of various methods to solve Linear differential equations
19COE301.5	5. Solve partial differential equation and difference equation
19COE301.6	6. Evaluate laplace transform by making use of properties and solution of differential

Course Name:Object Oriented Programming (3ET2)& Object Oriented Programming Lab (3ETP7)
At the end of course, Student will be able to:

Course Outcomes:	
19COE302.1	1. To Justify the basic concept of object-oriented programming.
19COE302.2	2. To Design, implement, test and debug simple programs in C++ using Functions.
19COE302.3	3. To Understand polymorphisam in OOP using C++.
19COE302.4	4. To Understand and Implement Inheritance using C++.
19COE302.5	5. To Design and To implement simple programs in Java using Classes, Objects and Inheritance.
19COE302.6	6. To Design and test the implementation of Object Oriented programming concepts.

Course Name:Electronic Devices & Circuits (3ET3) & Electronic Devices & Circuits Lab (3ETPP8)
At the end of course, Student will be able to:

Course Outcomes:	
19COE302.1	1. Comprehend the knowledge of diode and its applications in rectifier and regulator
19COE302.2	2. Analyze the RC circuit using different input signals, Understant Diode Clippers
19COE302.3	3. Understand basic of BJT and their operational parameters
19COE302.4	4. Understand feedback concept, topologies and their applications
19COE302.5	5. Comprehend the knowledge of Multistage amplifiers and Field Effect Transistors
19COE302.6	6. Implement and analyze Electronic and wave shaping circuits

Course Name: (3ET4)Instrumentation & Sensor
At the end of course, Student will be able to:

Course Outcomes:	
19COE404.1	1. To Comprehend fundamental knowledge of transducers, instrumentation and measurement systems.
19COE404.2	2. To Understand working principle and design of Displacement, Liquid Level measurement.

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19COE404.3	3. To Understand working principle and design of Temperature, Pressure, Flow and Humidity measurement.
19COE404.4	4. To Understand working principle of Velocity, Strain measurement
19COE404.5	5. To impart the knowledge of Data acquisition and applications of Electronic Instruments Analog & Digital data acquisition system

Course Name: (3ET5) Electromagnetic Wave

At the end of course, Student will be able to:

Course Outcomes:	
20COE305.1	1. Apply vector calculus to understand the behavior of static electric and magnetic
20COE305.2	2.Formulate and solve problems in electrostatics and magnetostatics in dielectric
20COE305.3	3. Describe and analyze electromagnetic wave propagation in free-space.
20COE305.4	4. Analyze plane electromagnetic waves at boundaries between homogeneous media.
20COE305.5	5. Analyze the electromagnetic radiation from localized charges considering

Course Name: (3ETP9)Skill Development Lab-I (Measurements, Testing & Instrumentation)

At the end of course, Student will be able to:

Course Outcomes:	
19COE309.1	1. To understand different types of electronic testing and measuring equipments.
19COE309.2	2. To understand use of various signal/function generators and analyzers used in electronics measurements
19COE309.3	3. To understand use of various Oscilloscope and Analyzers used in electronics measurement system.

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Department of Electronics & Telecommunication Engineering

Course Outcomes

IV Semester

Course Name: Signals and System (4ET01)

At the end of course, Student will be able to:

Course Outcomes:	
19COE401.1	1. Describe signals mathematically and understand how to perform mathematical
19COE401.2	2. Analyze the spectral characteristics of continuous-time periodic and aperiodic
19COE401.3	3. Classify systems based on their properties and determine the response of LTI
19COE401.4	4. Analyze system properties based on impulse response and Fourier analysis.
19COE401.5	5. Understand the process of sampling and its effects. and Apply the Laplace

Course Name: Network Analysis (4ET2)

At the end of course, Student will be able to:

Course Outcomes:	
19COE403.1	1. Analyze electrical circuits using mesh and node analysis.
19COE403.2	2. Analyze electrical circuits using suitable network theorems.
19COE403.3	3. Draw oriented graph of the network to determine their currents and voltages.
19COE403.4	4. Apply Laplace Transform for circuit analysis.
19COE403.5	5. Relate various two port network and apply two-port network theory for network

Course Name: Analog Electronics I (4ET3)& Analog Electronics I Lab (4ETP7)

At the end of course, Student will be able to:

Course Outcomes:	
19COE403.1	1. Analyze different wave shaping circuits.
19COE403.2	2. Perform evaluation of the switching behavior of semiconductor devices.
19COE403.3	3. Comprehend the knowledge of basic concepts and performance parameters of Op-Amp.
19COE403.4	4. Use Op-Amp for implementation of linear applications
19COE403.5	5. Comprehend the knowledge of non-linear applications of Op-Amp, PLL and data
19COE403.6	6. Implement wave shaping circuits & various applications of Op-Amp

Course Name: Digital Electronics I (4ET4) & Digital Electronics I Lab (4ETP8)

At the end of course, Student will be able to:

Course Outcomes:	
19COE404.1	1. Apply Boolean Algebra and number systems to solve logic functions and
19COE404.2	2.Simplify combinational logic ckt using K-map.
19COE404.3	3.To design MSI ckts using 74/54 series chips.
19COE404.4	4.Analyze and design sequential circuits.
19COE404.5	5.Analyze clocked sequential networks and study different types of semiconductor
19COE404.6	6.Design and Implement SSI,MSI,LSI,combinational and sequential logic circuits.

Course Name:Communication Engineering - I (4ET5) & Communication Engineering - I Lab (4ETP9)

At the end of course, Student will be able to:

Course Outcomes:	
19COE405.1	1. Understand the concept of Amplitude Modulation including its frequency
19COE405.2	2.Comprehend the AM Receivers and various Demodulation schemes in analog
19COE405.3	3. Comprehend the concept of Frequency Modulation system and compare it with
19COE405.4	4. Understand FM receivers along with impact of noise in FM reception including
19COE405.5	5. Differentiate between parallel & co-axial transmission line and the properties of
19COE405.6	6. Explain principle of antennas, radiation and to study various antennas used at

Course Name:Skill Development Lab-II (Software) (4ETP10)

At the end of course, Student will be able to:

Course Outcomes:	
19COE410.1	1. Design & Develop simple web based applications on their own.
19COE410.2	2. Design and develop applications by using Java Scripting.
19COE410.2	3. Identify existing processes/solution methods for solving the problem, including

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Course Outcomes
V Semester

Course Name: Analog Electronics-II(5ET1) & Analog Electronics-II Lab(5ETP6)
At the end of course, Student will be able to:

Course Outcomes:	
19COE501.1	1. Acquire and apply knowledge for design of voltage regulator circuits using ICs and discrete components
19COE501.2	2. Analyze and design electronic circuits for various linear applications
19COE501.3	3. Analyze and design electronic circuits for various non-linear applications
19COE501.4	4. Design various waveform generator circuits using different ICs.
19COE501.5	5. Design various types of active filters & temperature monitoring system using Op-Amp and sensors
19COE501.6	6. Implement various analog electronics circuits using suitable ICs and passive components

Course Name: Power Electronics & Design (5ET2) & Power Electronics & Design Lab (5ETP7)
At the end of course, Student will be able to:

Course Outcomes:	
19COE502.1	1. Understand the Construction, characteristics & application of different power devices.
19COE502.2	2. Understand the basic operation & Derive the output voltage, current of phase controlled rectifiers with & without FWD in R-L load for single phase and three phase supply.
19COE502.3	3. Analyze various types of commutation techniques. Understanding the various types of inverter circuits.
19COE502.4	4. Understand the basic principle, types & control techniques of choppers & cyclo-converters.
19COE502.5	5. Illustrate the operation of various types of DC motor and stepper motor, single phase and three phase Induction Motor and Servomotor
19COE502.6	6. Apply the knowledge of various power semiconductor devices, converters and drives for examining the operation

Course Name: Microprocessor and Microcontroller (5ET3) & Microprocessor and Microcontroller Lab (5ETP8)
At the end of course, Student will be able to:

Course Outcomes:	
19COE503.1	1. To study fundamentals of microprocessor systems.
19COE503.2	2. Understanding microprocessor Assembly Language Programming concepts and different data transfer schemes.
19COE503.3	3. To deal interfacing of different peripheral devices with Microprocessor.
19COE503.4	4. To study fundamentals of microcontroller systems.
19COE503.5	5. Understanding microcontroller Assembly Language Programming concepts &To get knowledge of interfacing different peripheral devices with Microcontroller.
19COE503.6	6. Develop skill of writing programs in ALP for various applications of 8085 & 8051 & Interface various peripherals with 8085 & 8051.

Course Name: Communication Engg.-II (5ET4)

At the end of course, Student will be able to:

Course Outcomes:	
19COE504.1	1. To understand the fundamentals of Probability theory and random processes.
19COE504.2	2. To study principles of Electromagnetic Wave propagation.
19COE504.3	3. To study various pulse modulation and demodulation techniques used in transmission of analog signal.
19COE504.4	4. To understand the concept of sampling and quantization in digital transmission system.
19COE504.5	5. To study multiplexing and basics of telephone switching system.

Course Name: FE-I(SOFC) (5ET5)

At the end of course, Student will be able to:

Course Outcomes:	
19COE505.1	1. Understand the basic Concepts of orbital aspects & orbital effects in Satellite Communications
19COE505.2	2.Explain the fundamentals of Electromagnetic field Propogation,Analyze Satellite Link Model
19COE505.3	3. Summarize GPS services of Satellite Communications
19COE505.4	4. Comprehend the kownledge for basic Concepts of Optical Fiber Communications
19COE505.5	5. Illustrate the functioning of Optical Sources & Detectors.

Course Name: Skill Development Lab-III (Simulation) (5ETP9)

At the end of course, Student will be able to:

Course Outcomes:	
19COE509.1	1. To write program scripts, functions, simulate experimental models,generate different plots and explore results using simulation tools to draw valid conclusions and inferences in engineering problems.

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Course Outcomes

VI Semester

Course Name: (6ET1) MICROCONTROLLER PROGRAMMING & APPLICATIONS

At the end of course, Student will be able to:

Course Outcomes:	
19COE601.1	1. To understand and familiarize with the members of AVR family and its
19COE601.2	2. To understand the instructions set of AVR Microcontroller.
19COE601.3	3. To apply knowledge of instruction set of AVR and develop logic in assembly and
19COE601.4	4. To understand in built peripherals of AVR microcontroller.
19COE601.5	5. To implement a system for dedicated applications and Understand different serial

Course Name: (6ET2) Control System Engineering

At the end of course, Student will be able to:

Course Outcomes:	
19COE602.1	1. Understand the principles fiber-optic communication, the components and Losses andTo

19COE602.2	2. Understand time response of the LTI system and its stability analysis.
19COE602.3	3. Understand use of frequency response of the LTI system for System stability analysis
19COE602.4	4. Understand the use of other frequency response analysis techniques for measuring system
19COE602.5	5. Study State Variable Analysis of the system and stability of the digital control system.

Course Name: Digital Communication (6ET3) & Digital Communication Lab (6ETP7)

At the end of course, Student will be able to:

Course Outcomes:	
19COE603.1	1. Understand the fundamental building blocks of digital communication systems,
19COE603.2	2. Understand the fundamentals of information theory and analyze information
19COE603.3	3. Analyze performance of different digital modulation techniques using
19COE603.4	4. Understand methods to mitigate inter symbol interference in baseband
19COE603.5	5. Implement different error control coding schemes for the reliable transmission.
19COE603.6	6.Developing source code/performing hardware based practical to study different

Course Name: DIGITAL SIGNAL PROCESSING (6ET4) &DIGITAL SIGNAL PROCESSING (6ETP8) Lab

At the end of course, Student will be able to:

Course Outcomes:	
19COE604.1	1. Examine the discrete time signals and identify the type system.
19COE604.2	2. Solve the z-transform of a sequence, identify its region of convergence, and
19COE604.3	3. Evaluate the Fourier transform of a signal.
19COE604.4	4. Design FIR and IIR filters.
19COE604.5	5. Discuss the concepts of Multirate Digital Signal Processing and need of Filter
19COE604.6	6. Generate different plots and explore results to draw valid conclusions and

Course Name: (6ET5) FE-II Introduction to Wireless Technology

At the end of course, Student will be able to:

Course Outcomes:	
19COE605.1	1. Comprehend the knowledge of different generations of wireless networks and
19COE605.2	2. Understand the fundamentals and evolution of cellular technology
19COE605.3	3. Understand GSM System with its architecture and signal processing
19COE605.4	4. Understand CDMA System with its architecture and channel structure
19COE605.5	5. Comprehend the knowledge of Wireless LAN and PAN

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Course Outcomes

VII Semester

Course Name: DCN (7XT1)

At the end of course, Student will be able to:

18COE701.1	Identify different types of network devices and their functions within a network.
18COE701.2	Describe different types of network topologies and protocols.
18COE701.3	Differentiate the layers of the OSI and TCP/IP model.
18COE701.4	Understand various types of routing algorithms and concepts of IP addresses.
18COE701.5	Understand and Describe various Application Layer Protocols.
18COE701.6	Deal with security issues in data network.

Course Name: MCA (7XT2)

At the end of course, Student will be able to:

18COE702.1	1. To understand the 8051 Architecture and serial/parallel bus standards
18COE702.2	2. To understand the instructions set of AVR Microcontroller.
18COE702.3	3. To analyze ADCs, DACs, sensors & develop logic in programming of 8051
18COE702.4	4. To understand interfacing and programming of peripherals with 8051 and design various systems using it.
18COE702.5	5. To study basics of serial communication ,Real time clock and its programming and 8051 C-programming.
18COE702.6	6. Develop assembly language programs for arithmetic, logical operations in 8051 and interfacing of 8051 with various peripherals.

Course Name: DSP (7XT3)

At the end of course, Student will be able to:

18COE703.1	1. Examine the discrete time signals and identify the type system.
18COE701.2	2. Solve the z-transform of a sequence, identify its region of convergence, and compute the inverse z-transform.
18COE701.3	3. Evaluate the Fourier transform of a signal.
18COE701.4	4. Design FIR and IIR filters.
18COE701.5	5.Discuss the concepts of Multirate Digital Signal Processing and need of Filter banks, architecture of DSP processor TMS320C54XX.
18COE701.6	6.Generate different plots and explore results to draw valid conclusions and inferences in DSP problems.

Course Name: PE-I(VLSI Design) (7XT4)

At the end of course, Student will be able to:

18COE704.1	1. Demonstrate the knowledge of need of VLSI design & its importance in various applications. Illustrate IC manufacturing process & CMOS Technology, various IC design pa rameters and explain various tools for IC design
18COE704.2	2. Explain different aspects of VHDL for VLSI design, understand & differentiate between the various VHDL modeling techniques and model combinational & sequential circuits using VHDL.
18COE704.3	3.Demonstrate the knowledge of concepts such as simulation, synthesis & realization of digital circuits using VHDL and related to various HDLs.
18COE704.3	4. Illustrate the architecture of CPLD & FPGA, understand Xilinx/ Altera as tool for CPLD & FPGA design and apply these techniques for digital circuit designing
18COE704.4	5.Explain various CMOS logic families, build digital circuits using these families and compare them related to their speed, area and power consumption. Illustrate the process of fabrication of MOS transistors, apply the design rules for designing CMOS layouts and perform case study of ALU/Sequence detector.

VIII SEM

Course Name: UHF &M (8XT1)

At the end of course, Student will be able to:

18COE801.1	1. Understand the operation and analysis of microwave tubes.
18COE801.2	2. Understand principle of operation and analysis of solid state microwave devices.
18COE801.3	3. Describe the the principles of microwave transmission through Waveguides and microstrip lines with their analysis.
18COE801.4	4. Comprehend the knowledge transmission line, cavity and dielectric Microwave resonators
18COE801.5	5. Understand and principle of operation of microwave components with formulation of scaterring matrix and measurement techniques for microwave parameters
18COE801.6	6.Implement the methods of measurement of microwave parameters in the laboratory and analyse results.

Course Name: ECD (8XT2)

At the end of course, Student will be able to:

18COE802.1	1. Understand analog circuit design and its applications such as design of voltage regulator and various opamp based circuits such as comparator, window detector scaling and summing amplifier.
18COE802.2	2. Design of waveform generator circuit using IC741, IC8038, IC655. Understand the working and design of first and second order filters
18COE802.3	3.Demonstrate the knowledge of concepts such as simulation, synthesis & realization of digital circuits using VHDL and related to various HDLs.

18COE802.4	4. Enplain the different aspects of CMOS circuit in VLSI design. undurstand the basic physical design of simple logic gates
18COE802.5	5. understand the VLSI design flow, demonstrate various VHDL coding styles to describe the digial system. design combinational and sequential circuits
18COE802.6	6. Verify the operation of linear voltage regulator, analyze the performance of various analog circuits, implement CMOS ckts using tool like Xilinx, Mixrowind etc.

Course Name: WCOMM (8XT3)

At the end of course, Student will be able to:

18COE803.1	1. Perform evaluation of the switching behavior of semiconductor devices
18COE803.2	2. Comprehend the knowledge of basic concepts and performance parameters of Op-Amp.
18COE803.3	3. Use Op-Amp for implementation of linear applications.
18COE803.4	4. Use Op-Amp for implementation of non-linear applications.
18COE803.5	5. Comprehend the knowledge of data converter and PLL & its applications

Course Name: PE-II(BM) (8XT4)

At the end of course, Student will be able to:

18COE804.1	1.Undersatnd fundametals of Medical Instrustrumentation,Biomedical Signals and Electrodes
18COE804.2	2.Illustrate the significance of human signals and recording techniques
18COE804.3	3.Familiarize with Modern medical imaging systems.
18COE804.4	4.Describe Need of Physiological and electrotherapy equipments
18COE804.5	5.Conceptualize requirements and importance of Patient care,Monitoring,Safety and Computers in Biomedical Engineering.

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Course Outcomes

III Semester

Course Name:(3ET01)Engineering Mathematic-III

At the end of course, Student will be able to:

Course Outcomes:	
19COE301.1	1. Apply the knowledge of vector calculus to solve physical problem and find Fourier, sine,
19COE301.2	2. Determine analytical function, Taylor's and Laurent's series
19COE301.3	3. Solve polynomial equations, system of linear equations and differential equations by differet methods.
19COE301.4	4. Make a use of various methods to solve Linear differential equations
19COE301.5	5. Solve partial differential equation and difference equation
19COE301.6	6. Evaluate laplace transform by making use of properties and solution of differential

Course Name:Object Oriented Programming (3ET2)& Object Oriented Programming Lab (3ETP7)

At the end of course, Student will be able to:

Course Outcomes:	
19COE302.1	1. To Justify the basic concept of object-oriented programming.
19COE302.2	2. To Design, implement, test and debug simple programs in C++ using Functions.
19COE302.3	3. To Understand polymorphisam in OOP using C++.
19COE302.4	4. To Understand and Implement Inheritance using C++.
19COE302.5	5. To Design and To implement simple programs in Java using Classes, Objects and Inheritance.
19COE302.6	6. To Design and test the implementation of Object Oriented programming concepts.

Course Name:Electronic Devices & Circuits (3ET3) & Electronic Devices & Circuits Lab (3ETPP8)

At the end of course, Student will be able to:

Course Outcomes:	
19COE302.1	1. Comprehend the knowledge of diode and its applications in rectifier and regulator
19COE302.2	2. Analyze the RC circuit using different input signals, Understant Diode Clippers
19COE302.3	3. Understand basic of BJT and their operational parameters
19COE302.4	4. Understand feedback concept, topologies and their applications
19COE302.5	5. Comprehend the knowledge of Multistage amplifiers and Field Effect Transistors
19COE302.6	6. Implement and analyze Electronic and wave shaping circuits

Course Name: (3ET4)Instrumentation & Sensor

At the end of course, Student will be able to:

Course Outcomes:	
19COE404.1	1. To Comprehend fundamental knowledge of transducers, instrumentation and measurement systems.
19COE404.2	2. To Understand working principle and design of Displacement, Liquid Level measurement.

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19COE404.3	3. To Understand working principle and design of Temperature, Pressure, Flow and Humidity measurement.
19COE404.4	4. To Understand working principle of Velocity, Strain measurement
19COE404.5	5. To impart the knowledge of Data acquisition and applications of Electronic Instruments Analog & Digital data acquisition system

Course Name: (3ET5) Electromagnetic Wave

At the end of course, Student will be able to:

Course Outcomes:	
20COE305.1	1. Apply vector calculus to understand the behavior of static electric and magnetic
20COE305.2	2.Formulate and solve problems in electrostatics and magnetostatics in dielectric
20COE305.3	3. Describe and analyze electromagnetic wave propagation in free-space.
20COE305.4	4. Analyze plane electromagnetic waves at boundaries between homogeneous media.
20COE305.5	5. Analyze the electromagnetic radiation from localized charges considering

Course Name: (3ETP9)Skill Development Lab-I (Measurements, Testing & Instrumentation)

At the end of course, Student will be able to:

Course Outcomes:	
19COE309.1	1. To understand different types of electronic testing and measuring equipments.
19COE309.2	2. To understand use of various signal/function generators and analyzers used in electronics measurements
19COE309.3	3. To understand use of various Oscilloscope and Analyzers used in electronics measurement system.

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Course Outcomes

IV Semester

Course Name: Signals and System (4ET01)

At the end of course, Student will be able to:

Course Outcomes:	
19COE401.1	1. Describe signals mathematically and understand how to perform mathematical
19COE401.2	2. Analyze the spectral characteristics of continuous-time periodic and aperiodic
19COE401.3	3. Classify systems based on their properties and determine the response of LTI
19COE401.4	4. Analyze system properties based on impulse response and Fourier analysis.
19COE401.5	5. Understand the process of sampling and its effects. and Apply the Laplace

Course Name: Network Analysis (4ET2)

At the end of course, Student will be able to:

Course Outcomes:	
19COE403.1	1. Analyze electrical circuits using mesh and node analysis.
19COE403.2	2. Analyze electrical circuits using suitable network theorems.
19COE403.3	3. Draw oriented graph of the network to determine their currents and voltages.
19COE403.4	4. Apply Laplace Transform for circuit analysis.
19COE403.5	5. Relate various two port network and apply two-port network theory for network

Course Name: Analog Electronics I (4ET3)& Analog Electronics I Lab (4ETP7)

At the end of course, Student will be able to:

Course Outcomes:	
19COE403.1	1. Analyze different wave shaping circuits.
19COE403.2	2. Perform evaluation of the switching behavior of semiconductor devices.
19COE403.3	3. Comprehend the knowledge of basic concepts and performance parameters of Op-Amp.
19COE403.4	4. Use Op-Amp for implementation of linear applications
19COE403.5	5. Comprehend the knowledge of non-linear applications of Op-Amp, PLL and data
19COE403.6	6. Implement wave shaping circuits & various applications of Op-Amp

Course Name: Digital Electronics I (4ET4) & Digital Electronics I Lab (4ETP8)

At the end of course, Student will be able to:

Course Outcomes:	
19COE404.1	1. Apply Boolean Algebra and number systems to solve logic functions and
19COE404.2	2.Simplify combinational logic ckt using K-map.
19COE404.3	3.To design MSI ckts using 74/54 series chips.
19COE404.4	4.Analyze and design sequential circuits.
19COE404.5	5.Analyze clocked sequential networks and study different types of semiconductor
19COE404.6	6.Design and Implement SSI,MSI,LSI,combinational and sequential logic circuits.

Course Name:Communication Engineering - I (4ET5) & Communication Engineering - I Lab (4ETP9)

At the end of course, Student will be able to:

Course Outcomes:	
19COE405.1	1. Understand the concept of Amplitude Modulation including its frequency
19COE405.2	2.Comprehend the AM Receivers and various Demodulation schemes in analog
19COE405.3	3. Comprehend the concept of Frequency Modulation system and compare it with
19COE405.4	4. Understand FM receivers along with impact of noise in FM reception including
19COE405.5	5. Differentiate between parallel & co-axial transmission line and the properties of
19COE405.6	6. Explain principle of antennas, radiation and to study various antennas used at

Course Name:Skill Development Lab-II (Software) (4ETP10)

At the end of course, Student will be able to:

Course Outcomes:	
19COE410.1	1. Design & Develop simple web based applications on their own.
19COE410.2	2. Design and develop applications by using Java Scripting.
19COE410.2	3. Identify existing processes/solution methods for solving the problem, including

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Course Outcomes
V Semester

Course Name: Analog Electronics-II(5ET1) & Analog Electronics-II Lab(5ETP6)
At the end of course, Student will be able to:

Course Outcomes:	
19COE501.1	1. Acquire and apply knowledge for design of voltage regulator circuits using ICs and discrete components
19COE501.2	2. Analyze and design electronic circuits for various linear applications
19COE501.3	3. Analyze and design electronic circuits for various non-linear applications
19COE501.4	4. Design various waveform generator circuits using different ICs.
19COE501.5	5. Design various types of active filters & temperature monitoring system using Op-Amp and sensors
19COE501.6	6. Implement various analog electronics circuits using suitable ICs and passive components

Course Name: Power Electronics & Design (5ET2) & Power Electronics & Design Lab (5ETP7)
At the end of course, Student will be able to:

Course Outcomes:	
19COE502.1	1. Understand the Construction, characteristics & application of different power devices.
19COE502.2	2. Understand the basic operation & Derive the output voltage, current of phase controlled rectifiers with & without FWD in R-L load for single phase and three phase supply.
19COE502.3	3. Analyze various types of commutation techniques. Understanding the various types of inverter circuits.
19COE502.4	4. Understand the basic principle, types & control techniques of choppers & cyclo-converters.
19COE502.5	5. Illustrate the operation of various types of DC motor and stepper motor, single phase and three phase Induction Motor and Servomotor
19COE502.6	6. Apply the knowledge of various power semiconductor devices, converters and drives for examining the operation

Course Name: Microprocessor and Microcontroller (5ET3) & Microprocessor and Microcontroller Lab (5ETP8)
At the end of course, Student will be able to:

Course Outcomes:	
19COE503.1	1. To study fundamentals of microprocessor systems.
19COE503.2	2. Understanding microprocessor Assembly Language Programming concepts and different data transfer schemes.
19COE503.3	3. To deal interfacing of different peripheral devices with Microprocessor.
19COE503.4	4. To study fundamentals of microcontroller systems.
19COE503.5	5. Understanding microcontroller Assembly Language Programming concepts &To get knowledge of interfacing different peripheral devices with Microcontroller.
19COE503.6	6. Develop skill of writing programs in ALP for various applications of 8085 & 8051 & Interface various peripherals with 8085 & 8051.

Course Name: Communication Engg.-II (5ET4)

At the end of course, Student will be able to:

Course Outcomes:	
19COE504.1	1. To understand the fundamentals of Probability theory and random processes.
19COE504.2	2. To study principles of Electromagnetic Wave propagation.
19COE504.3	3. To study various pulse modulation and demodulation techniques used in transmission of analog signal.
19COE504.4	4. To understand the concept of sampling and quantization in digital transmission system.
19COE504.5	5. To study multiplexing and basics of telephone switching system.

Course Name: FE-I(SOFC) (5ET5)

At the end of course, Student will be able to:

Course Outcomes:	
19COE505.1	1. Understand the basic Concepts of orbital aspects & orbital effects in Satellite Communications
19COE505.2	2.Explain the fundamentals of Electromagnetic field Propogation,Analyze Satellite Link Model
19COE505.3	3. Summarize GPS services of Satellite Communications
19COE505.4	4. Comprehend the kownledge for basic Concepts of Optical Fiber Communications
19COE505.5	5. Illustrate the functioning of Optical Sources & Detectors.

Course Name: Skill Development Lab-III (Simulation) (5ETP9)

At the end of course, Student will be able to:

Course Outcomes:	
19COE509.1	1. To write program scripts, functions, simulate experimental models,generate different plots and explore results using simulation tools to draw valid conclusions and inferences in engineering problems.

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Department of Electronics & Telecommunication Engineering

Course Outcomes

VI Semester

Course Name: (6ET1) MICROCONTROLLER PROGRAMMING & APPLICATIONS

At the end of course, Student will be able to:

Course Outcomes:	
19COE601.1	1. To understand and familiarize with the members of AVR family and its
19COE601.2	2. To understand the instructions set of AVR Microcontroller.
19COE601.3	3. To apply knowledge of instruction set of AVR and develop logic in assembly and
19COE601.4	4. To understand in built peripherals of AVR microcontroller.
19COE601.5	5. To implement a system for dedicated applications and Understand different serial

Course Name: (6ET2) Control System Engineering

At the end of course, Student will be able to:

Course Outcomes:	
19COE602.1	1. Understand the principles fiber-optic communication, the components and Losses andTo

19COE602.2	2. Understand time response of the LTI system and its stability analysis.
19COE602.3	3. Understand use of frequency response of the LTI system for System stability analysis
19COE602.4	4. Understand the use of other frequency response analysis techniques for measuring system
19COE602.5	5. Study State Variable Analysis of the system and stability of the digital control system.

Course Name: Digital Communication (6ET3) & Digital Communication Lab (6ETP7)

At the end of course, Student will be able to:

Course Outcomes:	
19COE603.1	1. Understand the fundamental building blocks of digital communication systems,
19COE603.2	2. Understand the fundamentals of information theory and analyze information
19COE603.3	3. Analyze performance of different digital modulation techniques using
19COE603.4	4. Understand methods to mitigate inter symbol interference in baseband
19COE603.5	5. Implement different error control coding schemes for the reliable transmission.
19COE603.6	6.Developing source code/performing hardware based practical to study different

Course Name: DIGITAL SIGNAL PROCESSING (6ET4) &DIGITAL SIGNAL PROCESSING (6ETP8) Lab

At the end of course, Student will be able to:

Course Outcomes:	
19COE604.1	1. Examine the discrete time signals and identify the type system.
19COE604.2	2. Solve the z-transform of a sequence, identify its region of convergence, and
19COE604.3	3. Evaluate the Fourier transform of a signal.
19COE604.4	4. Design FIR and IIR filters.
19COE604.5	5. Discuss the concepts of Multirate Digital Signal Processing and need of Filter
19COE604.6	6. Generate different plots and explore results to draw valid conclusions and

Course Name: (6ET5) FE-II Introduction to Wireless Technology

At the end of course, Student will be able to:

Course Outcomes:	
19COE605.1	1. Comprehend the knowledge of different generations of wireless networks and
19COE605.2	2. Understand the fundamentals and evolution of cellular technology
19COE605.3	3. Understand GSM System with its architecture and signal processing
19COE605.4	4. Understand CDMA System with its architecture and channel structure
19COE605.5	5. Comprehend the knowledge of Wireless LAN and PAN

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Course Outcomes

VII Semester

Course Name: VLSI Design (7ET1) & VLSI Design (7ETP6)

At the end of course, Student will be able to:

Course Outcomes:	
19COE701.1	1. Demonstrate the knowledge of need of VLSI design & its importance in various applications, Illustrate IC manufacturing process & CMOS Technology, various IC design parameters and explain various tools for IC design
19COE701.2	2. Explain different aspects of VHDL for VLSI design, understand & differentiate between the various VHDL modeling techniques and model combinational & sequential circuits using VHDL.
19COE701.3	3.Demonstrate the knowledge of concepts such as simulation, synthesis & realization of digital circuits using VHDL and related to various HDLs.
19COE701.4	4. Illustrate the architecture of CPLD & FPGA, understand Xilinx/ Altera as tool for CPLD & FPGA design and apply these techniques for digital circuit designing
19COE701.5	5.Explain various CMOS logic families, build digital circuits using these families and compare them related to their speed, area and power consumption. Illustrate the process of fabrication of MOS transistors, apply the design rules for designing
19COE701.6	6. Verify the operation of logic gates, analyze the performance of CMOS ckts using tool like Xilinx, Mixrowind etc.

Course Name: Digital Image Processing (7ET2)

At the end of course, Student will be able to:

Course Outcomes:	
19COE703.1	1. Analyze general terminology of digital image processing
19COE703.2	2. Examine various types of images, intensity transformations, spatial filtering & analyse the performance of
19COE703.3	3. Develop Fourier transform for image processing in frequency domain to enhance the image
19COE703.4	4. Evaluate the methodologies for image restoration.
19COE703.5	5.To study and compare the performance of image compression techniques and To study image segmentation

Course Name: SATELLITE AND FIBER OPTIC COMMUNICATION (7ET3)

At the end of course, Student will be able to:

Course Outcomes:	
19COE505.1	1. Understand the basic Concepts of orbital aspects & orbital effects in Satellite Communications
19COE505.2	2.Explain the fundamentals of Electromagnetic field Propogation,Analyze Satellite Link Model
19COE505.3	3. Summarize GPS services of Satellite Communications

19COE505.4	4. Comprehend the kownledge for basic Concepts of Optical Fiber Communications
19COE505.5	5. Illustrate the functioning of Optical Sources & Detectors.

Course Name: IMQC (7ET4)

At the end of course, Student will be able to:

Course Outcomes:	
19COE704.1	1. To understand basics of management, administration and organization.
19COE704.2	2. Comprehend the knowledge of marketing management and materials management.
19COE704.3	3. To understand knowledge of personnel management and labour welfare in business orgnisation.
19COE704.4	4. To understand basics of project report and concept of budget and their components..
19COE704.5	5. Comprehend the knowledge of quality management tools and professional ethics.

Course Name: PLC & Automation (7ET5)

At the end of course, Student will be able to:

Course Outcomes:	
19COE705.1	1.Describe working of various blocks of PLC.
19COE705.2	2.Illustrate the use of various Input and Output Devices related to PLC
19COE705.3	3.Discuss and demonstrate various functions and instructions used in PLC programming.
19COE705.4	4.Develop the ladder programs for electronics applications.
19COE705.5	5.Develop the ladder programs for industrial applications &.Explain architecture, types and application of SCADA

Course Name: Skill Development Lab-V (Signal & Image Processing) (7ETp7)

At the end of course, Student will be able to:

Course Outcomes:	
19COE707.1	1. Evaluate the methodologies for image pre-processing and post processing.
19COE707.2	2. Apply image processing algorithms in practical applications.

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Course Outcomes

VIII Semester

Course Name: UHF& MICROWAVE (8ET1) & UHF& MICROWAVE (8ETP6) Lab

At the end of course, Student will be able to:

Course Outcomes:	
19COE801.1	1. Understand the operation and analysis of microwave tubes.
19COE801.2	2. Understand principle of operation and analysis of solid state microwave devices.
19COE801.3	3. Describe the the principles of microwave transmission through Waveguides and
19COE801.4	4. Comprehend the knowledge transmission line, cavity and dielectric Microwave

19COE801.5	5. Understand and principle of operation of microwave components with formulation
19COE801.6	6.Implement the methods of measurement of microwave parameters in the laboratory

Course Name: Wireless Communication (8ETC2)

At the end of course, Student will be able to:

Course Outcomes:	
19COE802.1	1. Illustrate the evolution of cellular mobile system and understand cellular concepts.
19COE802.2	2. Use design fundamentals of cellular radio system.
19COE802.3	3.Understand propagation mechanism and fading in mobile radio system.
19COE802.4	4. Demonstrate concepts of various 2nd and 3rd generation cellular systems and
19COE802.5	5. Illustrate concepts of various wireless data communication networks.

Course Name: Data Communication Network (8ET3)

At the end of course, Student will be able to:

Course Outcomes:	
19COE803.1	1. To Understand different types of networks, devices and their functions within a
19COE803.2	2. To undersatnd different data link layer protocol and mechnisms.
19COE803.3	3. To Understand different network routing and addressing techniques.
19COE803.4	4. To Understand and implement routing algorithms and traffic control techniques.
19COE803.5	5. To Understand and Describe various Application Layer Protocols and security

Course Name: BIOMEDICAL ENGINEERING (8ET4)

At the end of course, Student will be able to:

Course Outcomes:	
19COE804.1	1.Undersatnd fundametals of Medical Instrustrumentation,Biomedical Signals and
19COE804.2	2.Illustrate the significance of human signals and recording techniques
19COE804.3	3.Familiarize with Modern medical imaging systems.
19COE804.4	4.Describe Need of Physiological and electrotherapy equipments
19COE804.5	5.Conceptualize requirements and importance of patient care,safety,Anaesthesia

Course Name: SKILL DEVELOPMENT LAB- VI (8ETP6)

At the end of course, Student will be able to:

Course Outcomes:	
19COE806.1	1. Install, configure and operate various computer networks, networking devices and
19COE806.2	2. Analyze the performance of computer networks using simulation softwares.

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Course Outcomes

III Semester

Course Name: M-III (3ETC01)

At the end of course, Student will be able to:

20COE301.1	1. Apply the knowledge of vector calculus to solve physical problem and find Fourier, sine, cosine transform.
20COE301.2	2. Determine analytical function, Taylor's and Laurent's series
20COE301.3	3. Solve polynomial equations, system of linear equations and differential equations by differet methods.
20COE301.4	4. Make a use of various methods to solve Linear differential equations
20COE301.5	5. Solve partial differential equation and difference equation
20COE301.6	6. Evaluate laplace transform by making use of properties and solution of differential equatons by laplace transform methods.

Course Name: EDC (3ETC02)

At the end of course, Student will be able to:

20COE302.1	1. Comprehend the knowledge of diode and its applications in rectifier and regulator circuits.
20COE302.2	2. Analyze the RC circuit using different input signals, Understand Diode Clippers and Clampers
20COE302.3	3. Understand basic of BJT and their operational parameters
20COE302.4	4. Understand feedback concept, topologies and their applications
20COE302.5	5. Comprehend the knowledge of Multistage amplifiers and Field Effect Transistors
20COE302.6	6. Implement and analyze Electronic and wave shaping circuits

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Course Name: DSD (3ETC03)

At the end of course, Student will be able to:

21COE303.1	1.Use number systems ,conversion and arithmetic functions to solve logic functions.
21COE303.2	2.Apply Techniques of minimization of Boolean expression.
21COE303.3	3.To design MSI ckts using 74/54 series chips.
21COE303.4	4.Simplify combinational logic ckt using K-map.
21COE303.5	5. Understand logic families memories with their characteristics and analyze clocked sequential networks .
21COE303.6	6.Design and Implement SSI,MSI,LSI,combinational and sequential logic circuits.

Course Name: EMW (3ETC04)

At the end of course, Student will be able to:

21COE305.1	1. Apply vector calculus to understand the behavior of static electric and magnetic fields.
21COE305.2	2.Formulate and solve problems in electrostatics and magnetostatics in dielectric media.
21COE305.3	3. Describe and analyze electromagnetic wave propagation in free-space.
21COE305.4	4. Analyze plane electromagnetic waves at boundaries between homogeneous media.
21COE305.5	5. Analyze the electromagnetic radiation from localized charges considering retardation effects.

Course Name: OOP (3ETC05)

At the end of course, Student will be able to:

21COE305.1	Justify the basics of object-oriented programming concepts such as data types, functions, classes, objects, constructors, inheritance, overloading etc.
21COE305.2	Design, implement, test, and debug simple programs in C++ using Functions.
21COE305.3	Implementation of Classes and Objects with constructors and destuctors for C++ Programming.
21COE305.4	Apply the concept of operator overloading for C++ Programming.
21COE305.5	Design and test the implementation of C++ programming concepts using Inheritance
21COE305.6	Design and test the implementation of Java programming concepts.

Course Name: Envi.Science (3ET6)

At the end of course, Student will be able to:

21COE306.1	1. Comprehend the knowledge of enviornment and natural resources.
21COE306.2	2. Use the concept of echosystem.
21COE306.3	3. Implement the bidiversity conservation methods and its importance.
21COE306.4	4. Analysis of enviornmental pollution and types of disaster.
21COE306.5	5. Analysis of Incresase in population growth with its impact on enviornment and anthropogenic Activities.

IV Th Sem

Course Name: ADC (4ETC01)
At the end of course, Student will be able to:

21COE401.1	Understand the necessity of modulation and identify the various components of analog communication systems.
21COE401.2	Understand the concept of Frequency Modulation system, compare it with Amplitude Modulation system and FM receivers along with details of each block
21COE401.3	To apply the concepts of stochastics and statistics theory in communication systems and along with concepts of Probability theory in communication systems
21COE401.4	To analyse the performance of various pulse modulation schemes and to know the concept of sampling and quantization in digital transmission system.
21COE401.5	Understand basic building blocks of digital communication system and formatting of digital signal along with concepts of information theory and analyze information transmission over communication channel.
21COE401.6	Analyze performance of different digital modulation techniques

Course Name: AC (4ETC02)
At the end of course, Student will be able to:

20COE401.1	1. Perform evaluation of the switching behavior of semiconductor devices
20COE401.2	2. Comprehend the knowledge of basic concepts and performance parameters of Op-Amp.
20COE401.3	3. Use Op-Amp for implementation of linear applications.
20COE401.4	4. Use Op-Amp for implementation of non-linear applications.
20COE401.5	5. Comprehend the knowledge of data converter and PLL & its applications
20COE401.6	6.Implement wave shaping circuits using passive components to perform their analysis.

Course Name: NT (4ETC03)

At the end of course, Student will be able to:

20COE403.1	1. Analyze electrical circuits using mesh and node analysis.
20COE403.2	2. Analyze electrical circuits using suitable network theorems.
20COE403.3	3. Draw oriented graph of the network to determine their currents and voltages.
20COE403.4	4. Apply Laplace Transform for circuit analysis..
20COE403.5	5. Relate various two port network and apply two-port network theory for network analysis.
20COE403.6	6. Demonstrate and verify the different network theorem and function.

Course Name: S&S (4ETC04)

At the end of course, Student will be able to:

20COE404.1	1. Describe signals mathematically and understand how to perform mathematical operations on signals and systems.
20COE404.2	2. Analyze the spectral characteristics of continuous-time periodic and aperiodic signals using Fourier analysis.
20COE404.3	3. Classify systems based on their properties and determine the response of LTI system.
20COE404.4	4. Analyze system properties based on impulse response and Fourier analysis. transform for analysis of continuous-time and discrete-time systems.
20COE404.5	5. Understand the process of sampling and its effects. and Apply the for analysis of continuous-time and discrete-time systems.

Course Name: VALUES & E (4ETC05)

At the end of course, Student will be able to:

20COE405.1	Understand significance of value education and its implementation in life and profession
20COE405.2	Understand the concept of harmony in the human being
20COE405.3	Achievement of harmony in the family, society and nature/existance
20COE405.4	Get the knowledge of social ethics
20COE405.5	Acquire the knowledge of professional ethics, production systems and management models considering value based life and profession.

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Department of Electronics & Telecommunication Engineering
Course Outcomes
V Semester

Course Name: Analog Electronics-II(5ET1) & Analog Electronics-II Lab(5ETP6)
At the end of course, Student will be able to:

Course Outcomes:	
19COE501.1	1. Acquire and apply knowledge for design of voltage regulator circuits using ICs and discrete components
19COE501.2	2. Analyze and design electronic circuits for various linear applications
19COE501.3	3. Analyze and design electronic circuits for various non-linear applications
19COE501.4	4. Design various waveform generator circuits using different ICs.
19COE501.5	5. Design various types of active filters & temperature monitoring system using Op-Amp and sensors
19COE501.6	6. Implement various analog electronics circuits using suitable ICs and passive components

Course Name: Power Electronics & Design (5ET2) & Power Electronics & Design Lab (5ETP7)
At the end of course, Student will be able to:

Course Outcomes:	
19COE502.1	1. Understand the Construction, characteristics & application of different power devices.
19COE502.2	2. Understand the basic operation & Derive the output voltage, current of phase controlled rectifiers with & without FWD in R-L load for single phase and three phase supply.
19COE502.3	3. Analyze various types of commutation techniques. Understanding the various types of inverter circuits.
19COE502.4	4. Understand the basic principle, types & control techniques of choppers & cyclo-converters.
19COE502.5	5. Illustrate the operation of various types of DC motor and stepper motor, single phase and three phase Induction Motor and Servomotor
19COE502.6	6. Apply the knowledge of various power semiconductor devices, converters and drives for examining the operation

Course Name: Microprocessor and Microcontroller (5ET3) & Microprocessor and Microcontroller Lab (5ETP8)
At the end of course, Student will be able to:

Course Outcomes:	
19COE503.1	1. To study fundamentals of microprocessor systems.
19COE503.2	2. Understanding microprocessor Assembly Language Programming concepts and different data transfer schemes.
19COE503.3	3. To deal interfacing of different peripheral devices with Microprocessor.
19COE503.4	4. To study fundamentals of microcontroller systems.
19COE503.5	5. Understanding microcontroller Assembly Language Programming concepts &To get knowledge of interfacing different peripheral devices with Microcontroller.
19COE503.6	6. Develop skill of writing programs in ALP for various applications of 8085 & 8051 & Interface various peripherals with 8085 & 8051.

Course Name: Communication Engg.-II (5ET4)

At the end of course, Student will be able to:

Course Outcomes:	
19COE504.1	1. To understand the fundamentals of Probability theory and random processes.
19COE504.2	2. To study principles of Electromagnetic Wave propagation.
19COE504.3	3. To study various pulse modulation and demodulation techniques used in transmission of analog signal.
19COE504.4	4. To understand the concept of sampling and quantization in digital transmission system.
19COE504.5	5. To study multiplexing and basics of telephone switching system.

Course Name: FE-I(SOFC) (5ET5)

At the end of course, Student will be able to:

Course Outcomes:	
19COE505.1	1. Understand the basic Concepts of orbital aspects & orbital effects in Satellite Communications
19COE505.2	2.Explain the fundamentals of Electromagnetic field Propogation,Analyze Satellite Link Model
19COE505.3	3. Summarize GPS services of Satellite Communications
19COE505.4	4. Comprehend the kownledge for basic Concepts of Optical Fiber Communications
19COE505.5	5. Illustrate the functioning of Optical Sources & Detectors.

Course Name: Skill Development Lab-III (Simulation) (5ETP9)

At the end of course, Student will be able to:

Course Outcomes:	
19COE509.1	1. To write program scripts, functions, simulate experimental models,generate different plots and explore results using simulation tools to draw valid conclusions and inferences in engineering problems.

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Course Outcomes

VI Semester

Course Name: (6ET1) MICROCONTROLLER PROGRAMMING & APPLICATIONS

At the end of course, Student will be able to:

Course Outcomes:	
19COE601.1	1. To understand and familiarize with the members of AVR family and its
19COE601.2	2. To understand the instructions set of AVR Microcontroller.
19COE601.3	3. To apply knowledge of instruction set of AVR and develop logic in assembly and
19COE601.4	4. To understand in built peripherals of AVR microcontroller.
19COE601.5	5. To implement a system for dedicated applications and Understand different serial

Course Name: (6ET2) Control System Engineering

At the end of course, Student will be able to:

Course Outcomes:	
19COE602.1	1. Understand the principles fiber-optic communication, the components and Losses andTo

19COE602.2	2. Understand time response of the LTI system and its stability analysis.
19COE602.3	3. Understand use of frequency response of the LTI system for System stability analysis
19COE602.4	4. Understand the use of other frequency response analysis techniques for measuring system
19COE602.5	5. Study State Variable Analysis of the system and stability of the digital control system.

Course Name: Digital Communication (6ET3) & Digital Communication Lab (6ETP7)

At the end of course, Student will be able to:

Course Outcomes:	
19COE603.1	1. Understand the fundamental building blocks of digital communication systems,
19COE603.2	2. Understand the fundamentals of information theory and analyze information
19COE603.3	3. Analyze performance of different digital modulation techniques using
19COE603.4	4. Understand methods to mitigate inter symbol interference in baseband
19COE603.5	5. Implement different error control coding schemes for the reliable transmission.
19COE603.6	6.Developing source code/performing hardware based practical to study different

Course Name: DIGITAL SIGNAL PROCESSING (6ET4) &DIGITAL SIGNAL PROCESSING (6ETP8) Lab

At the end of course, Student will be able to:

Course Outcomes:	
19COE604.1	1. Examine the discrete time signals and identify the type system.
19COE604.2	2. Solve the z-transform of a sequence, identify its region of convergence, and
19COE604.3	3. Evaluate the Fourier transform of a signal.
19COE604.4	4. Design FIR and IIR filters.
19COE604.5	5. Discuss the concepts of Multirate Digital Signal Processing and need of Filter
19COE604.6	6. Generate different plots and explore results to draw valid conclusions and

Course Name: (6ET5) FE-II Introduction to Wireless Technology

At the end of course, Student will be able to:

Course Outcomes:	
19COE605.1	1. Comprehend the knowledge of different generations of wireless networks and
19COE605.2	2. Understand the fundamentals and evolution of cellular technology
19COE605.3	3. Understand GSM System with its architecture and signal processing
19COE605.4	4. Understand CDMA System with its architecture and channel structure
19COE605.5	5. Comprehend the knowledge of Wireless LAN and PAN

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Course Outcomes

VII Semester

Course Name: VLSI Design (7ET1) & VLSI Design (7ETP6)

At the end of course, Student will be able to:

Course Outcomes:	
19COE701.1	1. Demonstrate the knowledge of need of VLSI design & its importance in various applications, Illustrate IC manufacturing process & CMOS Technology, various IC design parameters and explain various tools for IC design
19COE701.2	2. Explain different aspects of VHDL for VLSI design, understand & differentiate between the various VHDL modeling techniques and model combinational & sequential circuits using VHDL.
19COE701.3	3.Demonstrate the knowledge of concepts such as simulation, synthesis & realization of digital circuits using VHDL and related to various HDLs.
19COE701.4	4. Illustrate the architecture of CPLD & FPGA, understand Xilinx/ Altera as tool for CPLD & FPGA design and apply these techniques for digital circuit designing
19COE701.5	5.Explain various CMOS logic families, build digital circuits using these families and compare them related to their speed, area and power consumption. Illustrate the process of fabrication of MOS transistors, apply the design rules for designing
19COE701.6	6. Verify the operation of logic gates, analyze the performance of CMOS ckts using tool like Xilinx, Mixrowind etc.

Course Name: Digital Image Processing (7ET2)

At the end of course, Student will be able to:

Course Outcomes:	
19COE703.1	1. Analyze general terminology of digital image processing
19COE703.2	2. Examine various types of images, intensity transformations, spatial filtering & analyse the performance of
19COE703.3	3. Develop Fourier transform for image processing in frequency domain to enhance the image
19COE703.4	4. Evaluate the methodologies for image restoration.
19COE703.5	5.To study and compare the performance of image compression techniques and To study image segmentation

Course Name: SATELLITE AND FIBER OPTIC COMMUNICATION (7ET3)

At the end of course, Student will be able to:

Course Outcomes:	
19COE505.1	1. Understand the basic Concepts of orbital aspects & orbital effects in Satellite Communications
19COE505.2	2.Explain the fundamentals of Electromagnetic field Propogation,Analyze Satellite Link Model
19COE505.3	3. Summarize GPS services of Satellite Communications

19COE505.4	4. Comprehend the kownledge for basic Concepts of Optical Fiber Communications
19COE505.5	5. Illustrate the functioning of Optical Sources & Detectors.

Course Name: IMQC (7ET4)

At the end of course, Student will be able to:

Course Outcomes:	
19COE704.1	1. To understand basics of management, administration and organization.
19COE704.2	2. Comprehend the knowledge of marketing management and materials management.
19COE704.3	3. To understand knowledge of personnel management and labour welfare in business orgnisation.
19COE704.4	4. To understand basics of project report and concept of budget and their components..
19COE704.5	5. Comprehend the knowledge of quality management tools and professional ethics.

Course Name: PLC & Automation (7ET5)

At the end of course, Student will be able to:

Course Outcomes:	
19COE705.1	1.Describe working of various blocks of PLC.
19COE705.2	2.Illustrate the use of various Input and Output Devices related to PLC
19COE705.3	3.Discuss and demonstrate various functions and instructions used in PLC programming.
19COE705.4	4.Develop the ladder programs for electronics applications.
19COE705.5	5.Develop the ladder programs for industrial applications &.Explain architecture, types and application of SCADA

Course Name: Skill Development Lab-V (Signal & Image Processing) (7ETp7)

At the end of course, Student will be able to:

Course Outcomes:	
19COE707.1	1. Evaluate the methodologies for image pre-processing and post processing.
19COE707.2	2. Apply image processing algorithms in practical applications.

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Course Outcomes

VIII Semester

Course Name: UHF& MICROWAVE (8ET1) & UHF& MICROWAVE (8ETP6) Lab

At the end of course, Student will be able to:

Course Outcomes:	
19COE801.1	1. Understand the operation and analysis of microwave tubes.
19COE801.2	2. Understand principle of operation and analysis of solid state microwave devices.
19COE801.3	3. Describe the the principles of microwave transmission through Waveguides and
19COE801.4	4. Comprehend the knowledge transmission line, cavity and dielectric Microwave

19COE801.5	5. Understand and principle of operation of microwave components with formulation
19COE801.6	6.Implement the methods of measurement of microwave parameters in the laboratory

Course Name: Wireless Communication (8ETC2)

At the end of course, Student will be able to:

Course Outcomes:	
19COE802.1	1. Illustrate the evolution of cellular mobile system and understand cellular concepts.
19COE802.2	2. Use design fundamentals of cellular radio system.
19COE802.3	3.Understand propagation mechanism and fading in mobile radio system.
19COE802.4	4. Demonstrate concepts of various 2nd and 3rd generation cellular systems and
19COE802.5	5. Illustrate concepts of various wireless data communication networks.

Course Name: Data Communication Network (8ET3)

At the end of course, Student will be able to:

Course Outcomes:	
19COE803.1	1. To Understand different types of networks, devices and their functions within a
19COE803.2	2. To undersatnd different data link layer protocol and mechnisms.
19COE803.3	3. To Understand different network routing and addressing techniques.
19COE803.4	4. To Understand and implement routing algorithms and traffic control techniques.
19COE803.5	5. To Understand and Describe various Application Layer Protocols and security

Course Name: BIOMEDICAL ENGINEERING (8ET4)

At the end of course, Student will be able to:

Course Outcomes:	
19COE804.1	1.Undersatnd fundametals of Medical Instrustrumentation,Biomedical Signals and
19COE804.2	2.Illustrate the significance of human signals and recording techniques
19COE804.3	3.Familiarize with Modern medical imaging systems.
19COE804.4	4.Describe Need of Physiological and electrotherapy equipments
19COE804.5	5.Conceptualize requirements and importance of patient care,safety,Anaesthesia

Course Name: SKILL DEVELOPMENT LAB- VI (8ETP6)

At the end of course, Student will be able to:

Course Outcomes:	
19COE806.1	1. Install, configure and operate various computer networks, networking devices and
19COE806.2	2. Analyze the performance of computer networks using simulation softwares.

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Course Outcomes

III Semester

Course Name: M-III (3ETC01)

At the end of course, Student will be able to:

20COE301.1	1. Apply the knowledge of vector calculus to solve physical problem and find Fourier, sine, cosine transform.
20COE301.2	2. Determine analytical function, Taylor's and Laurent's series
20COE301.3	3. Solve polynomial equations, system of linear equations and differential equations by differet methods.
20COE301.4	4. Make a use of various methods to solve Linear differential equations
20COE301.5	5. Solve partial differential equation and difference equation
20COE301.6	6. Evaluate laplace transform by making use of properties and solution of differential equatons by laplace transform methods.

Course Name: EDC(3ETC02)

At the end of course, Student will be able to:

20COE302.1	1. Comprehend the knowledge of diode and its applications in rectifier and regulator circuits.
20COE302.2	2. Analyze the RC circuit using different input signals, Understand Diode Clippers and Clampers
20COE302.3	3. Understand basic of BJT and their operational parameters
20COE302.4	4. Understand feedback concept, topologies and their applications
20COE302.5	5. Comprehend the knowledge of Multistage amplifiers and Field Effect Transistors
20COE302.6	6. Implement and analyze Electronic and wave shaping circuits

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Course Name: DSD (3ETC03)

At the end of course, Student will be able to:

21COE303.1	1.Use number systems ,conversion and arithmetic functions to solve logic functions.
21COE303.2	2.Apply Techniques of minimization of Boolean expression.
21COE303.3	3.To design MSI ckts using 74/54 series chips.
21COE303.4	4.Simplify combinational logic ckt using K-map.
21COE303.5	5. Understand logic families memories with their characteristics and analyze clocked sequential networks .
21COE303.6	6.Design and Implement SSI,MSI,LSI,combinational and sequential logic circuits.

Course Name: EMW (3ETC04)

At the end of course, Student will be able to:

21COE305.1	1. Apply vector calculus to understand the behavior of static electric and magnetic fields.
21COE305.2	2.Formulate and solve problems in electrostatics and magnetostatics in dielectric media.
21COE305.3	3. Describe and analyze electromagnetic wave propagation in free-space.
21COE305.4	4. Analyze plane electromagnetic waves at boundaries between homogeneous media.
21COE305.5	5. Analyze the electromagnetic radiation from localized charges considering retardation effects.

Course Name: OOP (3ETC05)

At the end of course, Student will be able to:

21COE305.1	Justify the basics of object-oriented programming concepts such as data types, functions, classes, objects, constructors, inheritance, overloading etc.
21COE305.2	Design, implement, test, and debug simple programs in C++ using Functions.
21COE305.3	Implementation of Classes and Objects with constructors and destuctors for C++ Programming.
21COE305.4	Apply the concept of operator overloading for C++ Programming.
21COE305.5	Design and test the implementation of C++ programming concepts using Inheritance
21COE305.6	Design and test the implementation of Java programming concepts.

Course Name: Envi.Science (3ET6)

At the end of course, Student will be able to:

21COE306.1	1. Comprehend the knowledge of enviornment and natural resources.
21COE306.2	2. Use the concept of echosystem.
21COE306.3	3. Implement the bidiversity conservation methods and its importance.
21COE306.4	4. Analysis of enviornmental pollution and types of disaster.
21COE306.5	5. Analysis of Incresase in population growth with its impact on enviornment and anthropogenic Activities.

IV Th Sem

Course Name: ADC (4ETC01)
At the end of course, Student will be able to:

21COE401.1	Understand the necessity of modulation and identify the various components of analog communication systems.
21COE401.2	Understand the concept of Frequency Modulation system, compare it with Amplitude Modulation system and FM receivers along with details of each block
21COE401.3	To apply the concepts of stochastics and statistics theory in communication systems and along with concepts of Probability theory in communication systems
21COE401.4	To analyse the performance of various pulse modulation schemes and to know the concept of sampling and quantization in digital transmission system.
21COE401.5	Understand basic building blocks of digital communication system and formatting of digital signal along with concepts of information theory and analyze information transmission over communication channel.
21COE401.6	Analyze performance of different digital modulation techniques

Course Name: AC (4ETC02)
At the end of course, Student will be able to:

20COE401.1	1. Perform evaluation of the switching behavior of semiconductor devices
20COE401.2	2. Comprehend the knowledge of basic concepts and performance parameters of Op-Amp.
20COE401.3	3. Use Op-Amp for implementation of linear applications.
20COE401.4	4. Use Op-Amp for implementation of non-linear applications.
20COE401.5	5. Comprehend the knowledge of data converter and PLL & its applications
20COE401.6	6.Implement wave shaping circuits using passive components to perform their analysis.

Course Name: NT (4ETC03)

At the end of course, Student will be able to:

20COE403.1	1. Analyze electrical circuits using mesh and node analysis.
20COE403.2	2. Analyze electrical circuits using suitable network theorems.
20COE403.3	3. Draw oriented graph of the network to determine their currents and voltages.
20COE403.4	4. Apply Laplace Transform for circuit analysis..
20COE403.5	5. Relate various two port network and apply two-port network theory for network analysis.
20COE403.6	6. Demonstrate and verify the different network theorem and function.

Course Name: S&S (4ETC04)

At the end of course, Student will be able to:

20COE404.1	1. Describe signals mathematically and understand how to perform mathematical operations on signals and systems.
20COE404.2	2. Analyze the spectral characteristics of continuous-time periodic and aperiodic signals using Fourier analysis.
20COE404.3	3. Classify systems based on their properties and determine the response of LTI system.
20COE404.4	4. Analyze system properties based on impulse response and Fourier analysis. transform for analysis of continuous-time and discrete-time systems.
20COE404.5	5. Understand the process of sampling and its effects. and Apply the for analysis of continuous-time and discrete-time systems.

Course Name: VALUES & E (4ETC05)

At the end of course, Student will be able to:

Course Name: SD-V(7ETp7)

At the end of course, Student will be able to:

20COE707.1	1. Evaluate the methodologies for image pre-processing and post processing.
20COE707.2	2. Apply image processing algorithms in practical applications.

Course Name: SD-VI (7ETp7)

At the end of course, Student will be able to:

20COE806.1	1. Install, configure and operate various computer networks, networking devices and protocols.
20COE806.2	2. Analyze the performance of computer networks using simulation softwares.

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Course Outcomes

V Semester

Course Name: Microcontroller (5ETC01)
Microcontroller Lab (5ETC06)

At the end of course, Student will be able to:

20COE501.1	1.Attain the knowledge of Microprocessor 8085
20COE501.2	2.Understand the Interfacing of various peripheral devices with Microprocessor 8085
20COE501.3	3.Attain the knowledge of Microcontroller 8051
20COE501.4	4.Understand assembly language & C Programming for Microcontrollers
20COE501.5	5.Understand the Interfacing of various peripheral devices with Microcontroller 8051
20COE501.6	6.Gain knowledge of advance Microcontrollers

Course Name: Control System (5ETC02)

At the end of course, Student will be able to:

20COE602.1	1. To understand the fundamental concepts of Control systems and mathematical modeling of the physical systems.
20COE602.2	2. Understand time response of the LTI system and its stability analysis.
20COE602.3	3. Understand use of frequency response of the LTI system for System stability analysis
20COE602.4	4. Understand the use of other frequency response analysis techniques for measuring system stability along with different mathematical calculations.
20COE602.5	5. Study State Variable Analysis of the system and stability of the digital control system.

Course Name: Digital Signal Processing (5ETC03)
Digital Signal Processing Lab (5ETC07)

At the end of course, Student will be able to:

20COE604.1	1. Examine the discrete time signals and identify the type system.
20COE604.2	2. Solve the z-transform of a sequence, identify its region of convergence, and compute the inverse z-transform.
20COE604.3	3. Evaluate the Fourier transform of a signal.
20COE604.4	4. Design FIR and IIR filters.
20COE604.5	5.Discuss the concepts of Multirate Digital Signal Processing and need of Filter banks, architecture of DSP processor TMS320C54XX.
20COE604.6	6.Generate different plots and explore results to draw valid conclusions and inferences in DSP problems.

Course Name: Power Electronics (Professional Elective-I) 5ETC04(1)
PE-I POWER ELECTRONICS Lab (5ETC08)

At the end of course, Student will be able to:

20COE501.1	1.Analyze and Understand the working of SCRs
20COE501.2	2.Illustrate the Construction, characteristics & operation of different power devices .
20COE501.3	3.Analyze and design controlled rectifiers and dual converters
20COE501.4	4.Analyze various types of inverter circuits.
20COE501.5	5.Analyze and design DC to DC,AC to AC converters.
2COE501.6	6.Design and develop power electronic circuits for various applications.

Course Name: PE-I FIBER OPTICS COMMUNICATION 5ETC04(2)

At the end of course, Student will be able to:

20COE501.1	1. Understand the principles fiber-optic communication, the components and Losses and dispersion in fiber

20COE501.2	2. Understand the properties of the optical fibers and optical components in sources.
20COE501.3	3. Understand operation of lasers, LEDs, and detectors in fiber
20COE501.4	4. Understand operation of different optical switches and deirectional couplers
20COE501.5	5. Understand the FOC System with Power budgeting parameters and principles of multiplexing

Course Name: OE-I SENSORS &TRANSDUCER (5ETC05)

At the end of course, Student will be able to:

20COE505.1	1.Describe the basic aspect of transducers, sensors,Generalized instrumentation system.
20COE505.2	2. Apply the knowledge of statistical characteristic and Errors in measurement system.
20COE505.3	3. Describe the fundamental concept about temperature and Velocity measurement
20COE505.4	4. Illustrate the knowledge of measurement of displacement and Humidity.
20COE505.5	5. Represent measurement system for Pressure, Flow, Level, strain.

Course Name: Communication Network(6ETC01)

At the end of course, Student will be able to:

20COE601.1	1. To Understand different types of networks, devices and their functions within a network.
21COE601.2	2. To undersatnd different data link layer protocol and mechnisms.
21COE601.3	3. To Understand different network routing and addressing techniques.
21COE601.4	4. To Understand and implement routing algorithms and traffic control techniques.

21COE601.5	5. To Understand and Describe various Application Layer Protocols and security issues in data network
21COE601.6	6. Understand various Application layer Protocols. Developing source code/performing software based practical to study different network, installation, monitoring, and troubleshooting of current LAN systems

Course Name: COMPUTER ARCHITECTURE(6ETC02)
At the end of course, Student will be able to:

20COE602.1	1. To Understand the basic concepts and structure of computers
22COE602.2	2. To analyze and implement various number formats, instruction set and concepts of arithmetic operations
22COE602.3	3. To study and implement the concepts of microinstruction, its sequencing and execution.
22COE602.4	4. To study different types of memories and understand memory organization
22COE602.5	5. To study I/o devices and implement parallel processors

Course Name: PE-2: CMOS Design (6ETC03)

At the end of course, Student will be able to:

22COE603.1	To understand Moore's Law, MOS capacitances, MOS transistor models, Non-ideal behavior of the MOS Transistor. CMOS Inverter and its Characteristics
22COE603.2	To study CMOS Design Flow, CMOS Process enhancements, Circuit Elements, CMOS Lambda-based Design Rules, Stick Diagrams, Physical layout, RC Parasitic CMOS Fabrication
22COE603.3	To understand concepts of delays in CMOS, RC and linear delay model, logical path efforts, power, interconnect and robustness in CMOS circuit layout.
22COE603.4	To design CMOS logic gates design, Complex CMOS circuit, Transmission gate, Pass transistor logic
22COE603.5	Design of latches and Flip-flops, Static Read- Write memory (SRAM) Circuits, Dynamic Read-Write Memory Circuits.
22COE603.6	To understand importance of CMOS clocking styles, Clock distribution techniques, Clock Jitter. Dynamic Pass transistor logic, Dynamic CMOS logic, Domino logic and NORA logic

Course Name: PE-2: PE2: Satellite Communication(6ETC03)

At the end of course, Student will be able to:

20COE603.1	1.Understand the fundamentals of Satellite Comminucation.
20COE603.2	2.Demonstrate the orbital mechanism in Satellite Communications
20COE603.3	3.Conceptulized the orbital Effects of Satellite Communication
20COE603.4	4.Explain the fundamentals of Electromagnetic field Propogation,Analyze Satellite Link Model
20COE603.5	5.Visualize the architecture of satellite sub-systems and its role in VSAT and GPS services

Course Name: OE2: OE2: Database Management System (6ETC04)

At the end of course, Student will be able to:

21COE605.1	1.To understand Basic knowledge of file structure and Data Base.
21COE605.2	2.To comprehend Entity Relation Diagram and data Modeling.
21COE605.3	3. To comprehend the SQL query and structure.
21COE605.4	4. To comprehend the process of building normalization and apply to the database system.
21COE605.5	5.To comprehend the transaction which applied on database and the issues of concurrency and dead lock control.

Course Name: OE2: Introduction to Python Programming (6ETC04)

At the end of course, Student will be able to:

21COE604.1	Interpret the fundamental Python syntax and semantics
21COE604.2	Be fluent in the use of Python control flow statements
21COE604.3	Perform basic CURD operations on Mongo DB using Python
21COE604.4	Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, tuples and sets.
21COE604.5	Identify the commonly used operations involving file systems and regular expressions and use of operators

Course Name: Economics for Engineers (6ETC05)

At the end of course, Student will be able to:

22COE605.1	1. Learn basics of Engineering Economics.
22COE605.2	2. Understand and Compute the Production Cost.
22COE605.3	3. Study different Cash Flow methods.
22COE605.4	4. Evaluate Engineering Alternatives.
22COE605.5	5. Understand Depriciation Analysis.
22COE605.6	6. Understand Indian Banking System.

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Course Outcomes

VII Semester

Course Name: VLSI Design (7ET1) & VLSI Design (7ETP6)

At the end of course, Student will be able to:

Course Outcomes:	
19COE701.1	1. Demonstrate the knowledge of need of VLSI design & its importance in various applications, Illustrate IC manufacturing process & CMOS Technology, various IC design parameters and explain various tools for IC design
19COE701.2	2. Explain different aspects of VHDL for VLSI design, understand & differentiate between the various VHDL modeling techniques and model combinational & sequential circuits using VHDL.
19COE701.3	3.Demonstrate the knowledge of concepts such as simulation, synthesis & realization of digital circuits using VHDL and related to various HDLs.
19COE701.4	4. Illustrate the architecture of CPLD & FPGA, understand Xilinx/ Altera as tool for CPLD & FPGA design and apply these techniques for digital circuit designing
19COE701.5	5.Explain various CMOS logic families, build digital circuits using these families and compare them related to their speed, area and power consumption. Illustrate the process of fabrication of MOS transistors, apply the design rules for designing
19COE701.6	6. Verify the operation of logic gates, analyze the performance of CMOS ckts using tool like Xilinx, Mixrowind etc.

Course Name: Digital Image Processing (7ET2)

At the end of course, Student will be able to:

Course Outcomes:	
19COE703.1	1. Analyze general terminology of digital image processing
19COE703.2	2. Examine various types of images, intensity transformations, spatial filtering & analyse the performance of
19COE703.3	3. Develop Fourier transform for image processing in frequency domain to enhance the image
19COE703.4	4. Evaluate the methodologies for image restoration.
19COE703.5	5.To study and compare the performance of image compression techniques and To study image segmentation

Course Name: SATELLITE AND FIBER OPTIC COMMUNICATION (7ET3)

At the end of course, Student will be able to:

Course Outcomes:	
19COE505.1	1. Understand the basic Concepts of orbital aspects & orbital effects in Satellite Communications
19COE505.2	2.Explain the fundamentals of Electromagnetic field Propogation,Analyze Satellite Link Model
19COE505.3	3. Summarize GPS services of Satellite Communications

19COE505.4	4. Comprehend the kownledge for basic Concepts of Optical Fiber Communications
19COE505.5	5. Illustrate the functioning of Optical Sources & Detectors.

Course Name: IMQC (7ET4)

At the end of course, Student will be able to:

Course Outcomes:	
19COE704.1	1. To understand basics of management, administration and organization.
19COE704.2	2. Comprehend the knowledge of marketing management and materials management.
19COE704.3	3. To understand knowledge of personnel management and labour welfare in business orgnisation.
19COE704.4	4. To understand basics of project report and concept of budget and their components..
19COE704.5	5. Comprehend the knowledge of quality management tools and professional ethics.

Course Name: PLC & Automation (7ET5)

At the end of course, Student will be able to:

Course Outcomes:	
19COE705.1	1.Describe working of various blocks of PLC.
19COE705.2	2.Illustrate the use of various Input and Output Devices related to PLC
19COE705.3	3.Discuss and demonstrate various functions and instructions used in PLC programming.
19COE705.4	4.Develop the ladder programs for electronics applications.
19COE705.5	5.Develop the ladder programs for industrial applications &.Explain architecture, types and application of SCADA

Course Name: Skill Development Lab-V (Signal & Image Processing) (7ETp7)

At the end of course, Student will be able to:

Course Outcomes:	
19COE707.1	1. Evaluate the methodologies for image pre-processing and post processing.
19COE707.2	2. Apply image processing algorithms in practical applications.

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Course Outcomes

VIII Semester

Course Name: UHF& MICROWAVE (8ET1) & UHF& MICROWAVE (8ETP6) Lab

At the end of course, Student will be able to:

Course Outcomes:	
19COE801.1	1. Understand the operation and analysis of microwave tubes.
19COE801.2	2. Understand principle of operation and analysis of solid state microwave devices.
19COE801.3	3. Describe the the principles of microwave transmission through Waveguides and
19COE801.4	4. Comprehend the knowledge transmission line, cavity and dielectric Microwave

19COE801.5	5. Understand and principle of operation of microwave components with formulation
19COE801.6	6.Implement the methods of measurement of microwave parameters in the laboratory

Course Name: Wireless Communication (8ETC2)

At the end of course, Student will be able to:

Course Outcomes:	
19COE802.1	1. Ilustrate the evolution of cellular mobile system and understand cellular concepts.
19COE802.2	2. Use design fundamentals of cellular radio system.
19COE802.3	3.Understand propagation mechanism and fading in mobile radio system.
19COE802.4	4. Demonstrate concepts of various 2nd and 3rd generation cellular systems and
19COE802.5	5. Ilustrate concepts of various wireless data communication networks.

Course Name: Data Communication Network (8ET3)

At the end of course, Student will be able to:

Course Outcomes:	
19COE803.1	1. To Understand different types of networks, devices and their functions within a
19COE803.2	2. To undersatnd different data link layer protocol and mechnisms.
19COE803.3	3. To Understand different network routing and addressing techniques.
19COE803.4	4. To Understand and implement routing algorithms and traffic control techniques.
19COE803.5	5. To Understand and Describe various Application Layer Protocols and security

Course Name: BIOMEDICAL ENGINEERING (8ET4)

At the end of course, Student will be able to:

Course Outcomes:	
19COE804.1	1.Undersatnd fundametals of Medical Instrustrumentation,Biomedical Signals and
19COE804.2	2.Illustrate the significance of human signals and recording techniques
19COE804.3	3.Familiarize with Modern medical imaging systems.
19COE804.4	4.Describe Need of Physiological and electrotherapy equipments
19COE804.5	5.Conceptualize requirements and importance of patient care,safety,Anaesthesia

Course Name: SKILL DEVELOPMENT LAB- VI (8ETP6)

At the end of course, Student will be able to:

Course Outcomes:	
19COE806.1	1. Install, configure and operate various computer networks, networking devices and
19COE806.2	2. Analyze the performance of computer networks using simulation softwares.

UG-
Mechanical

Prof. Ram Meghe Institute of Technology & Research, Badnera
Mechanical Engineering Department
List of COs 2018-19

Course Code	**Engineering Mathematics I**
C101	**Course Outcomes**
C101.1	Learners will be able to identify algebraic problems and its applications for practical areas.
C101.2	Students will be capable to use derivatives to approximate a continuous function into a polynomial.
C101.3	Students will be able to extend the basic ideas of the calculus of functions of single variables to functions of several variables and concept of homogeneous function and its application.
C101.4	Learners will be able to find crucial roots of complex numbers.
Course Code	**Engineering Physics**
C102	**Course Outcomes**
C102.1	The students will be able to classify the solids on the basis of their energy band diagrams. .
C102.2	The students will be able to apply the concepts and knowledge of Compton scattering, LASER and de-Broglie's matter waves and their applications.
C102.3	They will be able to apply fundamental knowledge of electric and magnetic fields in particular applications
C102.4	The students will be able to apply the concepts and fundamentals of interference of light to investigate wavelength of monochromatic light and refractive index of transparent liquids.
C102.5	The students will get an insight of an optical fibre and propagation of light through an optical fibre
C102.6	The students will be able to design acoustically good hall.
Course Code	**Engineering Mechanics**
C103	**Course Outcomes**
C103.1	The students will be able to apply the basic principles of mechanics to define structural models and solve wide range of engineering problems.
C103.2	The students will develop an ability to design and conduct mechanics experiments.
C103.3	The students will be able to analyze and interpret experimental and computational mechanics data.

C103.4	The students will understand the fundamentals that will enable the appropriate use and development of techniques, skills and modern engineering tools necessary for engineering practice.
C103.5	The students will be able to solve the professional and ethical responsibilities with effective communication.
C103.6	The students will gain the confidence and ability to integrate the above outcomes for turning in an entrepreneur.
Course Code	**Engineering Drawing**
C104	**Course Outcomes**
C104.1	The students will gain the knowledge of the various practice standards in Engineering Drawing.
C104.2	The students will be able to read and understand the technical drawing.
C104.3	The students will be able to construct machine parts as a application of engineering drawing.
C104.4	The students will be able to construct the projections of objects and isometric views.
C104.5	The student will have a good hand on free hand sketches in technical aspects.
C104.6	The students will develop an ability to handle drawing instruments.
Course Code	**Workshop-I**
C105	**Course Outcomes**
C105.1	Students will be able to –
C105.2	Design and Model various prototypes in the Smity such as making various profile shape.
C105.3	Design and Model various prototypes in Fitting such as Straight Fit, and V fit.
C105.4	Design and Model various prototypes in Fitting such as filing hack saw cutting, drilling and tapping.
C105.5	Design the metal joining with the help of internal and external threading.
C105.6	Understand in the foundry such as as and molding, patterns , types of molding sands.
Course Code	**Engineering Mathematics II**
C106	**Course Outcomes**
C106.1	Learner will be able to handle conveniently many complicated expressions, which occur in electrical and mechanical systems by expressing them in a matrix form.

C106.2	In many physical phenomenon like vibration of string, electromagnetic field theory are periodic, learner will be able to discuss the representation and periodic functions as an infinite series.
C106.3	Learner will be able to demonstrate the knowledge of vector algebra and carry out mathematical operations with scalar and vector quantities.
C106.4	Learner will be able to obtain formula for areas and volumes of triangles, spheres, cones and to grace the basics of complex integration.
C106.5	Leaner will be able to calculate the volume of three dimensional shapes and average value of a function over region.
C106.6	They will be able to trace the curves from the given equation of the curves.
Course Code	**Engineering Chemistry**
C107	**Course Outcomes**
C107.1	The student will be able to apply the knowledge of soft and hard water for domestic, industrial, engineering material and chemical processes, and technology involved in water softening methods such as lime- Soda, Zeolite and Ion exchange method.
C107.2	The student will gain the knowledge about corrosion and will be able to apply for the prevention of metals by various techniques.
C107.3	The student will gain the knowledge about raw materials, compositions, types and properties of portland cement and techniques involved in the manufacturing process.
C107.4	The student will gain the knowledge of fossil fuels and use of fuel in automobile industrial applications such as I.C engine and Diesel engine and. Also the techniques in manufacturing of synthetic fuels (Cracking process).
C107.5	The student will gain the knowledge about polymer and rubber by studying structure, composition, synthetic techniques, properties and process of vulcanization and its importance etc.
C107.6	The students will get the knowledge of basics of environment and its structure required for sustainable development and environmental
Course Outcomes	**Computer Programming**
C108	
C108.1	The students will be able to understand working of computer system.

C108.2	The students will be able to design and use appropriate algorithms.
C108.3	The students will be able to design, implement and test various programs in C-language involving multiple test files
C108.4	The students will be able to process large amount of data, facilitate efficient storing, accessing and manipulation of data items.
C108.5	The students will gain the knowledge about pointers which supports the dynamic memory management, reduce length and complexity of program and reduce the program execution time.
C108.6	The student will be able to design a structure that helps to organize complex data in meaningful way.
Course Code	**Electrical Engineering**
C109	**Course Outcomes**
C109.1	Students will gain the fundamental knowledge of D.C circuits, Network theorems & their applications.
C109.2	Students will get basics of magnetic properties and their applications in the real world
C109.3	Students will be able to understand about A.C. circuits, behavior of various electrical components in A.C.
C109.4	Students will be able to understand the importance of three phase circuit over single phase
C109.5	Students will be able gain knowledge about various motors and transformer
C109.6	Students will know about different measuring instruments, safety devices and earthing with their applications.
Course Code	**Workshop-II**
C110	**Course Outcomes**
C110.1	Students will be able to –
C110.2	Understand applications of hand tools and power tools.
C110.3	Select the appropriate tools required for specific operation.
C110.4	Comprehend the safety measures required to be taken while using the tools.
C110.5	Design various profile shape with metal sheet.
C110.6	Design and model various prototypes in the carpentry trade such as Cross lap joint, Dove tail joint.
Course Code	**Mathematics-III**
201	**Course Outcomes**
C201.1	Demonstrate the knowledge to solve ordinary Linear Differential equations with constant coefficient

C201.2	To Define the Laplace transform and its inverse transform for the basic functions.
C201.3	Apply False Position, Newton Raphson method to solve nonlinear & polynomial equations
C201.4	Define Gradient, divergent and curl of vector point functions. Finds the directional derivatives of scalar point functions.
Course Code	**Mechanics of Material**
202	**Course Outcomes**
C202.1	Basic concept and applications of verious tests to identify material properties
C202.2	Gaining the knowledge of materials
C202.3	Study different types of load considerastions
C202.4	Develop and evaluate alternatives for mechanical systems
C202.5	Develop ability to analyse design and material selection
Course Code	**Fluid Power - I**
203	**Course Outcomes**
C203.1	Knowledge of fluid & its characterstics
C203.2	Application of fluid laws
C203.3	Estimation of process performance
C203.4	Knowlede and application of real life fluid problems
C203.5	Design of fluid system
C203.6	Prediction of behaviour of fluid system
Course Code	**Engineering Thermodynamic**
204	**Course Outcomes**
C204.1	Understand the basic concept of thermodynamics such as systems, properties and state.
C204.2	Apply first law of thermodynamic
C204.3	Apply second law of thermodynamic and understand concept of entropy
C204.4	Understand the concept of air standerd cycles.
Course Code	**Manufactring Process-I**
205	**Course Outcomes**
C205.1	understand the basic concept of foundry process and related activities
C205.2	understand the concept of complete sand casting process with advance casting methods
C205.3	uderstand the fundamentals of welding process
C205.4	understand verious processes like electroplating, anodizing etc and its improtance in industry

Course Code	**Basic Electrical Drives and Control**
206	**Course Outcomes**
C206.1	Study of workingof Electrical drives and its components
C206.2	Understand basics of DC motor and its characterstics
C206.3	Studythw workingAC motor, Induction motor, concept of braking.
C206.4	Study of different speed control methods of A.C. and D.C. motors
C206.5	Study, design of transducers and its applications
C206.6	Study of Industrial Applications of different drives
Course Code	**Engineering Metallurgy**
207	**Course Outcomes**
C207.1	Understand the concept of metals and its physical and metallurgical properties
C207.2	Understand concept of steels alloy steels cast irons and non ferrous alloys
C207.3	Demonstrate the knowledge of verious heat treatment of metals
C207.4	Demonstrate the knowledge of applications of steels, cast irons, nonferrous alloys, mechanical properties of metals in industries
Course Code	**Energy Conversion- I**
208	**Course Outcomes**
C208.1	Understaand the concept of pure substance, properties of steam and its behaviour during various thermodynamic process.
C208.2	Understand working of powerplant, analyze & remember working of different boilers,Safety mountings, control mountings & acessories.
C208.3	Analyze flow of steam through nozzles & diffusers
C208.4	Evaluate the power developed by different turbines with steam as working fluid by different turbines with steam as working fluid by graphical & analytical method
C208.5	Understand construction & working of different types of condensers & cooling towers
Course Code	**Manufactring Process-II**
209	**Course Outcomes**
C209.1	Understand the basic concept of metal cutting and various manufacturing processes

C209.2	Demonstrate the knowledge of lathe, drilling, boring, milling and gear production machines
C209.3	Understand the verious unconventional machining processes
C209.4	Apply the knowledge of actual machining
Course Code	**Machine Design and Drawing -I**
210	**Course Outcomes**
C210.1	Student will be able to demonstrate the techniques of sactioning and visualising the objects
C210.2	Student will be able to develop machine component surfaces in order to fabricate them
C210.3	Considerations to design different machine components
C210.4	Student will be able to duplicate the design procudure for designing different mechanical joints
C210.5	Student will articulate the machine design procedure for developing the project work
C210.6	Student will develop self confidence as a mechanical engineer for Industry
Course Code	**Production Technology**
C301	**Course Outcomes**
C301.1	Knowledge of quality and quality management
C301.2	Application of statistical quality control tools
C301.3	Estimation of process capability
C301.4	Knowlede and application of work study techniques
C301.5	Design of inspection gauges
C301.6	Use of various inspection instruments
Course Code	**Heat Transfer**
C302	**Course Outcomes**
C302.1	Knowledge of steady state conduction
C302.2	Applications of conduction convection systems
C302.3	Understanding of rdiactive systems
C302.4	Estimation of forced convection heat transfer
C302.5	Knowledge of free convection and condensation and boiling
C302.6	Heat exchangers calculations and heat pipes
Course Code	**Measurment System**
C303	**Course Outcomes**
C303.1	Exhibit the concept of measurment system and to know its importance in industries
C303.2	Ability to measure various parameters like presure flow, speed, vibrations etc

C303.3	Ability to use verious measuring instruments
C303.4	Exhibit process approach of engineering and will confident in industry
C303.5	Demonstrate good skills in project work
Course Code	**Theory of Machines-I**
C304	**Course Outcomes**
C304.1	To understand the concept and its application of link, mechanism and machines
C304.2	To analyse the mechanism and machines on the basis of velocity and accelaration method
C304.3	To apply the use of synthesis of mechanism
C304.4	To evaluate and understand brake cluth dynometer gear train etc
C304.5	To create and evaluate of minimum projection
Course Code	**Computer Software Applications I Lab**
C305	**Course Outcomes**
C305.1	Student will able to understand and memorize the basics of DBMS
C305.2	Student will develop an ability to develop design of relational database
C305.3	Student will command over the MYSQL and perform relational algebra operation
C305.4	Student will articulate the simulation language and simulation packages
C305.5	Student will demonstrate the steps applied in simulation process
Course Code	**Fluid Power - II**
C306	**Course Outcomes**
C306.1	Basic concept of prime movers
C306.2	Power produced with hydraulic machine
C306.3	Design of power conservation and devices
C306.4	Design hydraulic machine with high frequecy
C306.5	Understand conceptof hydrostatic and hydrokinetic system
Course Code	**Computer Software Applications**
C307	**Course Outcomes**
C307.1	Student will able to understand and memorize the basics of DBMS
C307.2	Student will develop an ability to develop design of relational database

C307.3	Student will command over the MYSQL and perform relational algebra operation
C307.4	Student will articulate the simulation language and simulation packages
C307.5	Student will demonstrate the steps applied in simulation process
Course Code	**Control System Engineering**
C308	**Course Outcomes**
C308.1	Understand the basic concept and study different types of system
C308.2	Understand the concept of transient response analysis and will apply in numerical methods
C308.3	To knowledge of Industrial controllers and basic control actions of system
C308.4	Understand the concept of frequency response analysis method and use bode plot diagram in solving analytical problems
Course Code	**Theory of Machines-II**
C309	**Course Outcomes**
C309.1	To understand static force analysis and hydrodynamic lubrication
C309.2	Knowledge of analysis dynamic force analysis problem
C309.3	To apply knowledge of space mechanism and vehical dynamics
C309.4	To understand the concept of vibrations
C309.5	To understand the tortional vibrations
C309.6	To rember and understand balancing
Course Code	**Communication Skill**
C310	**Course Outcomes**
C310.1	Able to use language accurately fluently and appropriately
C310.2	Show their skills of listening understanding and interpreating
C310.3	Write project report, reviews resumes
C310.4	able to expresss their ideas relevant to given topics
C310.5	Exhibit skill of interview debeating and discussion
C310.6	Developing confidence smartness and outword skills as a techo-managerpossessing both the qualities i.e. professional and soft skills of communication
Course Code	**Machine design and drawing-II**
C401	**Course Outcomes**

C401.1	To remember and understand key, shaft, coupling for industrial applications
C401.2	To design and analyze bearings
C401.3	To apply, evaluate and select types of drives
C401.4	To understand, design and analyze I.C. engines parts and governors
Course Code	**Energy Conversion-II**
C402	**Course Outcomes**
C402.1	Remembering the applications of various energy conversion machines
C402.2	Understanding the working of machine like compressors, refrigerators, Air conditioners
C402.3	Applying technical knowledge to choose appropriate energy conversion device for specific applications
C402.4	To analyze nuclear and renewable energy scenario in India
C402.5	To evaluate the performance of various machine like compressors, refrigerator
Course Code	**Industrial Management and costing**
C403	**Course Outcomes**
C403.1	Understand the functions of management and setup of organization structure
C403.2	Understand and demonstrate marketing and human resource management skills
C403.3	Demonstrate the knowledge of materials management and inventory control
C403.4	Exhibits the knowledge of cost estimation costing, financial management
Course Code	**Automation Engineering**
C404	**Course Outcomes**
C404.1	Concept of automation and its importance to industry and society automated flow line, line balancing
C404.2	Create the skill of NC/CNCprograms
C404.3	Apply to develop the working model of robots
C404.4	Understand the concept of GT and its applications in FMS
C404.5	Apply the concept of CAPP and its application in FMS
C404.6	Fundamentals of CIM components of CIM and automation in inspection
Course Code	**Non Conventional Energy Sources**
C405	**Course Outcomes**

C405.1	Create Awareness about NCES
C405.2	Acquire the depth knowledge of NCES
C405.3	Understand the construction and performance of NCES
C405.4	Develop and utilize NCES
C405.5	Analyze the systems performance by using renewable Energies
C405.6	Evaluate conversion efficiency of renewable energies
Course Code	**Tool Engineering**
C406	**Course Outcomes**
C406.1	Apply the basic machine concept for tool life improvement during machining operation
C406.2	Design the various cutting tools and analyze the various cutting operations from tool design point
C406.3	Evaluate the need for implementation of mass production tools like jigs, fixtures, press tools
C406.4	Remember and apply the various concepts in location and clamping in industry
C406.5	Understand and remember working of various types of press tools
C406.6	Improve productivity through knowledge of tool design
Course Code	**Internal Combustion Engines**
C407	**Course Outcomes**
C407.1	Remembering type of engine, fuels, pollutants and its effect on human health
C407.2	Understanding working of various types of engines and its compatibility with fuels
C407.3	Applying technical knowledge to curb vehicular pollution
C407.4	To analyze various factors governing combustion phenomenon in engines
C407.5	To evaluate the performance of engines under various operating conditions
C407.6	To create the framework for evaluating the performance of engine
Course Code	**Operation Research Techniques**
C408	**Course Outcomes**
C408.1	Students will exhibits the basic knowledge of science, mathematics and engineering to formulate the real life situations into the OR problems and formulate OR models.
C408.2	Students will be able to formulate LPP from the situations from production engineering and solve these LPPs for implementing the decisions.

C408.3	Students will be able to formulate Transportation, Assignment, Sequencing, Queuing. Replacement problems and solve these problems by using the iterative methods.
C408.4	Students will be able to formulate Network models for the projects and understand the use of network techniques- PERT and CPM for planning, scheduling and controlling of the projects.
C408.5	Students will understand the concept of Simulation and how to use Monte Carlo simulation for various OR problems.
C408.6	Students will understand the concept of dynamic programming and how to solve dynamic programming problems.
C408.7	Students will be able to transfer abstract or theoretical ideas to practical situations and apply their engineering knowledge to analyze the problems and evaluate the better alternatives.
Course Code	**Automobile Engineering**
C409	**Course Outcomes**
C409.1	Understand the basics of Automobile and its component
C409.2	Identify the different parts of automobile
C409.3	Explain the working of various parts
C409.4	Describe how the steering suspension system operates
C409.5	Understand the environmental implications of Automobile engineering system operates
C409.6	understand the future development in automobile Industry
Course Code	**Production Planning and Control**
C410	**Course Outcomes**
C410.1	Importance of PPC its functions, Advantages
C410.2	Calculations of sales forecasts using various forecasting methods
C410.3	Criteria of batch size determination
C410.4	Concept of machine capacity loading of machines and man machine activity charts.
C410.5	Concept of inventory control and its systems
C410.6	Modern techniques/Philosophies of management like CIM,JIT,MRP
Course Code	**Refrigeration and Air Conditioning**
C411	**Course Outcomes**
C411.1	Understand basic concept of refrigeration process and VCR cycle
C411.2	Understand compound compression and multi-evaporation system

C411.3	Apply the knowledge of refrigeration components and controls
C411.4	Apply the concept of Psychrometry and air conditioning system
Course Code	**Robotics**
C412	**Course Outcomes**
C412.1	Understand the concept of robotics describe the robot anatomy
C412.2	Demonstrate the knowledge of end effector and its types
C412.3	Understand the concept of kinematics of robot and sensors
C412.4	Remember the concept of robot programming
C412.5	Apply the Knowledge of application of robot
C412.6	Evaluate the analytical problems for selection of robots
Course Code	**Project & Seminar**
C413	**Course Outcomes**
C413.1	Apply the knowledge of engineering fundamentals for the solution of engineering problems
C413.2	Ability to identify,formulat and analyse engineering problems using basic engeneering sciences and moder tools
C413.3	To acquire knowledge to assess societal, health, safety, legal issues
C413.4	Demonstrate knowledge for sustainable development using ethical practice
C413.5	Develop ability to work as a leader and as a member of multi desiplinary
C413.6	Ability to manage project and finance

HOD
Deptt. of Mechanical Engineering
P.R.M.I.T & R. Badnera

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C102.1	The students will be able to classify the solids on the basis of their energy band diagrams. .
C102.2	The students will be able to apply the concepts and knowledge of Compton scattering, LASER and de-Broglie's matter waves and their applications.
C102.3	They will be able to apply fundamental knowledge of electric and magnetic fields in particular applications
C102.4	The students will be able to apply the concepts and fundamentals of interference of light to investigate wavelength of monochromatic light and refractive index of transparent liquids.
C102.5	The students will get an insight of an optical fibre and propagation of light through an optical fibre
C102.6	The students will be able to design acoustically good hall.
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C104.5	The student will have a good hand on free hand sketches in technical aspects.
C104.6	The students will develop an ability to handle drawing instruments.
Course Code	**Workshop-I**
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C105.2	Design and Model various prototypes in the Smity such as making various profile shape.
C105.3	Design and Model various prototypes in Fitting such as Straight Fit, and V fit.
C105.4	Design and Model various prototypes in Fitting such as filing hack saw cutting, drilling and tapping.
C105.5	Design the metal joining with the help of internal and external threading.
C105.6	Understand in the foundry such as as and molding, patterns , types of molding sands.
Course Code	**Engineering Mathematics II**
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C106.4	Learner will be able to obtain formula for areas and volumes of triangles, spheres, cones and to grace the basics of complex integration.
C106.5	Leaner will be able to calculate the volume of three dimensional shapes and average value of a function over region.
C106.6	They will be able to trace the curves from the given equation of the curves.
Course Code	**Engineering Chemistry**
C107	**Course Outcomes**
C107.1	The student will be able to apply the knowledge of soft and hard water for domestic, industrial, engineering material and chemical processes, and technology involved in water softening methods such as lime- Soda, Zeolite and Ion exchange method.
C107.2	The student will gain the knowledge about corrosion and will be able to apply for the prevention of metals by various techniques.
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C108.3	The students will be able to design, implement and test various programs in C-language involving multiple test files
C108.4	The students will be able to process large amount of data, facilitate efficient storing, accessing and manipulation of data items.
C108.5	The students will gain the knowledge about pointers which supports the dynamic memory management, reduce length and complexity of program and reduce the program execution time.
C108.6	The student will be able to design a structure that helps to organize complex data in meaningful way.
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C109.1	Students will gain the fundamental knowledge of D.C circuits, Network theorems & their applications.
C109.2	Students will get basics of magnetic properties and their applications in the real world
C109.3	Students will be able to understand about A.C. circuits, behavior of various electrical components in A.C.
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C109.5	Students will be able gain knowledge about various motors and transformer
C109.6	Students will know about different measuring instruments, safety devices and earthing with their applications.
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C110.4	Comprehend the safety measures required to be taken while using the tools.
C110.5	Design various profile shape with metal sheet.
C110.6	Design and model various prototypes in the carpentry trade such as Cross lap joint, Dove tail joint.
Course Code	**Mathematics-III**
201	**Course Outcomes**
C201.1	Demonstrate the knowledge to solve ordinary Linear Differential equations with constant coefficient

C201.2	To Define the Laplace transform and its inverse transform for the basic functions.
C201.3	Apply False Position, Newton Raphson method to solve nonlinear & polynomial equations
C201.4	Define Gradient, divergent and curl of vector point functions. Finds the directional derivatives of scalar point functions.
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C202.1	Basic concept and applications of verious tests to identify material properties
C202.2	Gaining the knowledge of materials
C202.3	Study different types of load considerastions
C202.4	Develop and evaluate alternatives for mechanical systems
C202.5	Develop ability to analyse design and material selection
Course Code	**Fluid Power - I**
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C203.1	Knowledge of fluid & its characterstics
C203.2	Application of fluid laws
C203.3	Estimation of process performance
C203.4	Knowlede and application of real life fluid problems
C203.5	Design of fluid system
C203.6	Prediction of behaviour of fluid system
Course Code	**Engineering Thermodynamic**
204	**Course Outcomes**
C204.1	Understand the basic concept of thermodynamics such as systems, properties and state.
C204.2	Apply first law of thermodynamic
C204.3	Apply second law of thermodynamic and understand concept of entropy
C204.4	Understand the concept of air standerd cycles.
Course Code	**Manufactring Process-I**
205	**Course Outcomes**
C205.1	understand the basic concept of foundry process and related activities
C205.2	understand the concept of complete sand casting process with advance casting methods
C205.3	uderstand the fundamentals of welding process
C205.4	understand verious processes like electroplating, anodizing etc and its improtance in industry

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C206.1	Study of workingof Electrical drives and its components
C206.2	Understand basics of DC motor and its characterstics
C206.3	Studythw workingAC motor, Induction motor, concept of braking.
C206.4	Study of different speed control methods of A.C. and D.C. motors
C206.5	Study, design of transducers and its applications
C206.6	Study of Industrial Applications of different drives
Course Code	**Engineering Metallurgy**
207	**Course Outcomes**
C207.1	Understand the concept of metals and its physical and metallurgical properties
C207.2	Understand concept of steels alloy steels cast irons and non ferrous alloys
C207.3	Demonstrate the knowledge of verious heat treatment of metals
C207.4	Demonstrate the knowledge of applications of steels, cast irons, nonferrous alloys, mechanical properties of metals in industries
Course Code	**Energy Conversion- I**
208	**Course Outcomes**
C208.1	Understaand the concept of pure substance, properties of steam and its behaviour during various thermodynamic process.
C208.2	Understand working of powerplant, analyze & remember working of different boilers,Safety mountings, control mountings & acessories.
C208.3	Analyze flow of steam through nozzles & diffusers
C208.4	Evaluate the power developed by different turbines with steam as working fluid by different turbines with steam as working fluid by graphical & analytical method
C208.5	Understand construction & working of different types of condensers & cooling towers
Course Code	**Manufactring Process-II**
209	**Course Outcomes**
C209.1	Understand the basic concept of metal cutting and various manufacturing processes

C209.2	Demonstrate the knowledge of lathe, drilling, boring, milling and gear production machines
C209.3	Understand the verious unconventional machining processes
C209.4	Apply the knowledge of actual machining
Course Code	**Machine Design and Drawing -I**
210	**Course Outcomes**
C210.1	Student will be able to demonstrate the techniques of sactioning and visualising the objects
C210.2	Student will be able to develop machine component surfaces in order to fabricate them
C210.3	Considerations to design different machine components
C210.4	Student will be able to duplicate the design procudure for designing different mechanical joints
C210.5	Student will articulate the machine design procedure for developing the project work
C210.6	Student will develop self confidence as a mechanical engineer for Industry
Course Code	**Production Technology**
C301	**Course Outcomes**
C301.1	Knowledge of quality and quality management
C301.2	Application of statistical quality control tools
C301.3	Estimation of process capability
C301.4	Knowlede and application of work study techniques
C301.5	Design of inspection gauges
C301.6	Use of various inspection instruments
Course Code	**Heat Transfer**
C302	**Course Outcomes**
C302.1	Knowledge of steady state conduction
C302.2	Applications of conduction convection systems
C302.3	Understanding of rdiactive systems
C302.4	Estimation of forced convection heat transfer
C302.5	Knowledge of free convection and condensation and boiling
C302.6	Heat exchangers calculations and heat pipes
Course Code	**Measurment System**
C303	**Course Outcomes**
C303.1	Exhibit the concept of measurment system and to know its importance in industries
C303.2	Ability to measure various parameters like presure flow, speed, vibrations etc

C303.3	Ability to use verious measuring instruments
C303.4	Exhibit process approach of engineering and will confident in industry
C303.5	Demonstrate good skills in project work
Course Code	**Theory of Machines-I**
C304	**Course Outcomes**
C304.1	To understand the concept and its application of link, mechanism and machines
C304.2	To analyse the mechanism and machines on the basis of velocity and accelaration method
C304.3	To apply the use of synthesis of mechanism
C304.4	To evaluate and understand brake cluth dynometer gear train etc
C304.5	To create and evaluate of minimum projection
Course Code	**Computer Software Applications I Lab**
C305	**Course Outcomes**
C305.1	Student will able to understand and memorize the basics of DBMS
C305.2	Student will develop an ability to develop design of relational database
C305.3	Student will command over the MYSQL and perform relational algebra operation
C305.4	Student will articulate the simulation language and simulation packages
C305.5	Student will demonstrate the steps applied in simulation process
Course Code	**Fluid Power - II**
C306	**Course Outcomes**
C306.1	Basic concept of prime movers
C306.2	Power produced with hydraulic machine
C306.3	Design of power conservation and devices
C306.4	Design hydraulic machine with high frequecy
C306.5	Understand conceptof hydrostatic and hydrokinetic system
Course Code	**Computer Software Applications**
C307	**Course Outcomes**
C307.1	Student will able to understand and memorize the basics of DBMS
C307.2	Student will develop an ability to develop design of relational database

C307.3	Student will command over the MYSQL and perform relational algebra operation
C307.4	Student will articulate the simulation language and simulation packages
C307.5	Student will demonstrate the steps applied in simulation process
Course Code	**Control System Engineering**
C308	**Course Outcomes**
C308.1	Understand the basic concept and study different types of system
C308.2	Understand the concept of transient response analysis and will apply in numerical methods
C308.3	To knowledge of Industrial controllers and basic control actions of system
C308.4	Understand the concept of frequency response analysis method and use bode plot diagram in solving analytical problems
Course Code	**Theory of Machines-II**
C309	**Course Outcomes**
C309.1	To understand static force analysis and hydrodynamic lubrication
C309.2	Knowledge of analysis dynamic force analysis problem
C309.3	To apply knowledge of space mechanism and vehical dynamics
C309.4	To understand the concept of vibrations
C309.5	To understand the tortional vibrations
C309.6	To rember and understand balancing
Course Code	**Communication Skill**
C310	**Course Outcomes**
C310.1	Able to use language accurately fluently and appropriately
C310.2	Show their skills of listening understanding and interpreating
C310.3	Write project report, reviews resumes
C310.4	able to expresss their ideas relevant to given topics
C310.5	Exhibit skill of interview debeating and discussion
C310.6	Developing confidence smartness and outword skills as a techo-managerpossessing both the qualities i.e. professional and soft skills of communication
Course Code	**Machine design and drawing-II**
C401	**Course Outcomes**

C401.1	To remember and understand key, shaft, coupling for industrial applications
C401.2	To design and analyze bearings
C401.3	To apply, evaluate and select types of drives
C401.4	To understand, design and analyze I.C. engines parts and governors
Course Code	**Energy Conversion-II**
C402	**Course Outcomes**
C402.1	Remembering the applications of various energy conversion machines
C402.2	Understanding the working of machine like compressors, refrigerators, Air conditioners
C402.3	Applying technical knowledge to choose appropriate energy conversion device for specific applications
C402.4	To analyze nuclear and renewable energy scenario in India
C402.5	To evaluate the performance of various machine like compressors, refrigerator
Course Code	**Industrial Management and costing**
C403	**Course Outcomes**
C403.1	Understand the functions of management and setup of organization structure
C403.2	Understand and demonstrate marketing and human resource management skills
C403.3	Demonstrate the knowledge of materials management and inventory control
C403.4	Exhibits the knowledge of cost estimation costing, financial management
Course Code	**Automation Engineering**
C404	**Course Outcomes**
C404.1	Concept of automation and its importance to industry and society automated flow line, line balancing
C404.2	Create the skill of NC/CNCprograms
C404.3	Apply to develop the working model of robots
C404.4	Understand the concept of GT and its applications in FMS
C404.5	Apply the concept of CAPP and its application in FMS
C404.6	Fundamentals of CIM components of CIM and automation in inspection
Course Code	**Non Conventional Energy Sources**
C405	**Course Outcomes**

C405.1	Create Awareness about NCES
C405.2	Acquire the depth knowledge of NCES
C405.3	Understand the construction and performance of NCES
C405.4	Develop and utilize NCES
C405.5	Analyze the systems performance by using renewable Energies
C405.6	Evaluate conversion efficiency of renewable energies
Course Code	**Tool Engineering**
C406	**Course Outcomes**
C406.1	Apply the basic machine concept for tool life improvement during machining operation
C406.2	Design the various cutting tools and analyze the various cutting operations from tool design point
C406.3	Evaluate the need for implementation of mass production tools like jigs, fixtures, press tools
C406.4	Remember and apply the various concepts in location and clamping in industry
C406.5	Understand and remember working of various types of press tools
C406.6	Improve productivity through knowledge of tool design
Course Code	**Internal Combustion Engines**
C407	**Course Outcomes**
C407.1	Remembering type of engine, fuels, pollutants and its effect on human health
C407.2	Understanding working of various types of engines and its compatibility with fuels
C407.3	Applying technical knowledge to curb vehicular pollution
C407.4	To analyze various factors governing combustion phenomenon in engines
C407.5	To evaluate the performance of engines under various operating conditions
C407.6	To create the framework for evaluating the performance of engine
Course Code	**Operation Research Techniques**
C408	**Course Outcomes**
C408.1	Students will exhibits the basic knowledge of science, mathematics and engineering to formulate the real life situations into the OR problems and formulate OR models.
C408.2	Students will be able to formulate LPP from the situations from production engineering and solve these LPPs for implementing the decisions.

C408.3	Students will be able to formulate Transportation, Assignment, Sequencing, Queuing. Replacement problems and solve these problems by using the iterative methods.
C408.4	Students will be able to formulate Network models for the projects and understand the use of network techniques- PERT and CPM for planning, scheduling and controlling of the projects.
C408.5	Students will understand the concept of Simulation and how to use Monte Carlo simulation for various OR problems.
C408.6	Students will understand the concept of dynamic programming and how to solve dynamic programming problems.
C408.7	Students will be able to transfer abstract or theoretical ideas to practical situations and apply their engineering knowledge to analyze the problems and evaluate the better alternatives.
Course Code	**Automobile Engineering**
C409	**Course Outcomes**
C409.1	Understand the basics of Automobile and its component
C409.2	Identify the different parts of automobile
C409.3	Explain the working of various parts
C409.4	Describe how the steering suspension system operates
C409.5	Understand the environmental implications of Automobile engineering system operates
C409.6	understand the future development in automobile Industry
Course Code	**Production Planning and Control**
C410	**Course Outcomes**
C410.1	Importance of PPC its functions, Advantages
C410.2	Calculations of sales forecasts using various forecasting methods
C410.3	Criteria of batch size determination
C410.4	Concept of machine capacity loading of machines and man machine activity charts.
C410.5	Concept of inventory control and its systems
C410.6	Modern techniques/Philosophies of management like CIM,JIT,MRP
Course Code	**Refrigeration and Air Conditioning**
C411	**Course Outcomes**
C411.1	Understand basic concept of refrigeration process and VCR cycle
C411.2	Understand compound compression and multi-evaporation system

C411.3	Apply the knowledge of refrigeration components and controls
C411.4	Apply the concept of Psychrometry and air conditioning system
Course Code	**Robotics**
C412	**Course Outcomes**
C412.1	Understand the concept of robotics describe the robot anatomy
C412.2	Demonstrate the knowledge of end effector and its types
C412.3	Understand the concept of kinematics of robot and sensors
C412.4	Remember the concept of robot programming
C412.5	Apply the Knowledge of application of robot
C412.6	Evaluate the analytical problems for selection of robots
Course Code	**Project & Seminar**
C413	**Course Outcomes**
C413.1	Apply the knowledge of engineering fundamentals for the solution of engineering problems
C413.2	Ability to identify,formulat and analyse engineering problems using basic engeneering sciences and moder tools
C413.3	To acquire knowledge to assess societal, health, safety, legal issues
C413.4	Demonstrate knowledge for sustainable development using ethical practice
C413.5	Develop ability to work as a leader and as a member of multi desiplinary
C413.6	Ability to manage project and finance

HOD
Deptt. of Mechanical Engineering
P.R.M.I.T & R. Badnera

Prof. Ram Meghe Institute of Technology & Research, Badnera
Department of Mechanical Engineering
List of Cos_2019-20

Semester	Name of Subject	Code of Subject	CO number	Course Outcome
1Year Group A	Engineering Mathematics I	19COF101	19COF101.1	Make use of derivatives of a continuous function into a polynomial and solve indeterminate forms.
			19COF101.2	Extend the basic ideas of the calculus of functions of single variables to functions of several variables and its concept.
			19COF101.3	Compare real and imaginary equations and evaluate it.
			19COF101.4	Solve certain types of differential equations and utilize it for engineering problems of electronics, electrical circuit.
			19COF101.5	Determine infinite series and their convergence and divergence.
	Engineering Physics	19COF102	19COF102.1	The students will be able to classify semiconductors and explain the working of diodes using band theory of solids.
			19COF102.2	The students will be able to apply the knowledge of Quantum physics, Compton scattering, de-Broglie's matter waves, Heisenbergs Uncertainty Principle.
			19COF102.3	The students will be able to utilize knowledge of electric and magnetic fields in mass spectrograph and cathode ray oscilloscope.
			19COF102.4	The students will be able to understand and utilize the knowledge of interference & diffraction of light, optical fibers and lasers.
			19COF102.5	The students will make use of the knowledge of fluid dynamics , ultrasonic waves and acoustics in various applications.
			19COF102.6	The students will be able to develope experimental skills and identify the appropriate application of particular experiment.
	Engineering Mechanics	19COF 103	19COF 103.1	Organize and solve the forces along with its effect.
			19COF 103.2	Apply principles of statics to the system of rigid bodies to solve simple structures.
			19COF 103.3	Determine frictional forces for simple contacts, wedges and in coil friction.
			19COF 103.4	Evaluate centroid & moment of inertia for 2-D structures.
			19COF 103.5	Utilise the kinematic and kinetic equations.
			19COF 103.6	Elaborate the concepts related to engineering mechanics, determine the lifting machine parameters and prove it graphically.
	COMPUTER PROGRAMMING	19COF104	19COF104.1	Explain the fundamental of computer and computing concepts.

			19COF l 04.2	Discuss the fundamental of C language.
			19COF l 04.3	Illustrate the use of operators, expression and input-output operations.
			19COF l 04.4	Explain conditional branching, iteration and jumping statement.
			19COF l 04.5	Design functions, pointer, array & structures, use of string & file concepts.
			19COF l 04.6	Apply programming concepts to solve real life programming problems.
	Workshop Practice 1A5	19COF105	19COF105.1	Upon completion of this course, the students will be able to Expain and Demonstrate different manufacturing processes which are commonly appyled in industry.
			19COF105.2	How to devlop the components using various manufacturing techniques.
			19COF105.3	Analyze dimensional accuracy and match tolerances.
			19COF105.4	Design and will model of various prototypes in the Smity such as forming square/ hexagonal head bolt and hook.
			19COF105.5	Create different Jobs in Fitting such as filing hack saw cutting, drilling and tapping.
			19COF105.6	Applying knowledge of foundry suchs as and molding, patterns , types of molding sands.
1st Year Group B	Mathematics II	19COF l 06	19COF l 06.1	Make use of system of equations in matrix forms.
			19COF l 06.2	Find the periodic functions as an infinite series.
			19COF l 06.3	Solve integral by Beta, Gamma functions and reduction formulae.
			19COF l 06.4	Construct a curve from equation and apply differentiation under integral sign.
			19COF l 06.5	Evaluate double integral, triple integral and its applications.
	Engineering Chemistry	19COF107	19COF107.1	Describe properties of hard water, its disadvantages and various softening processes of water use for generation of steam.
			19COF107.2	Identify various types of corrosion, mechanism and control methods to protect metal and explain energy storage system and its applications.
			19COF107.3	Apply the knowledge of useful engineering materials such as cement, lubricant, industrial and polymeric materials.
			19COF107.4	Apply the knowledge of properties of chemical fuel based on analysis and numerical data.
			19COF107.5	Identify the various phases of system and complex compound by using thermodynamic variables and describe various spectrophotometric technique.
			19COF107.6	Determine the properties of useful engineering materials such as water, chemical fuel, lubricant based on laboratory technique.

	Basic Electrical Engineering	19COF10	19COF108.1	Find basic parameters of DC circuits like voltage, currents and resistance using theorems and transformation techniques.
			19COF108.2	Explain the different properties of electromagnets and phenomenon of electromagnetic induction in magnetic circuits.
			19COF108.3	Utilize the different terms of AC so as to build series and parallel AC circuits.
			19COF108.4	Simplify three phase system using star and delta connection to balance three phase load in high voltage applications.
			19COF108.5	Compare types and characteristics of Transformers as well as DC motors to decide their exact field of applications.
			19COF108.6	Discuss about the use of measuring instruments and safety precautions so as to operate electrical equipments and experimental kits in real time applications.
	Engineering Graphics	19COF109	19COF109. 1	Make use of the drawing instruments effectively to dimension the given figures.
			19COF109. 2	Explain the methods of projection.
			19COF109. 3	Define the sectional views of solids such as Prism, Pyramid, Cone, Cylinder & Cube.
			19COF109. 4	Identify the pictorial views of the object.
			19COF109. 5	Construct isometric scale, isometric projection & views.
			19COF109. 6	Develop the lateral surfaces of primitive solids by using CAD Software.
	English Communication Skill Lab	19COF110	19COF110.1	Recall the fundamental concepts of English language for communication purpose.
			19COF110.2	Demonstrate their ability to discuss in English language.
			19COF110.3	Develop their communication skills through group discussion.
			19COF110.4	Simplify their presentation skill through reading comprehension and extempore.
			19COF110.5	Find effective textual contents for improved communication through story and article writing.
			19COF110.6	Elaborate effective ways for healthy conversation to make their point of views clear to the listeners.
3	**MIII**	CO201	CO201.1	Make use of various methods to solve linear differential equation.
			CO201.2	Evaluate Laplace Transform by making use of properties and differential equation by Laplace transform method.
			CO201.3	Identify and solve partial differential equation of first order and to apply Empirical laws to given data from observation connecting to two variables.
			CO201.4	Determine analytic function, Taylor and Laurent's series.

			CO201.5	Solve polynomial equations, system of linear equations and differential equation by different method.
			CO201.6	Apply the knowledge of vector calculus to solve physical problem
			CO201	
	Mechanics of Material	CO202	CO202.1	Understand the knowledge of basic concepts of mechanics.
			CO202.2	Understand the fundamentals of various stresses and strains.
			CO202.3	Apply the various tests to identify the material properties.
			CO202.4	Analyze to find the optimum solutions for the various engineering problems after gaining the knowledge of mechanics.
	Fluid Power -I	CO203	C203.1	Knowledge of fluid & its characterstics
			C203.2	Application of fluid laws
			C203.3	Estimation of process performance
			C203.4	Knowlede and application of real life fluid problems
			C203.5	Design of fluid system & Prediction of behaviour of fluid system
			C203.6	To study & demonstrate the techniques of various fluid flow
	Enineering Thermodynamics	CO204	CO204.1	Understand the basic concepts of Thermodynamics such as system, properties and state
			CO204.2	Apply first law of thermodynamics
			CO204.3	Apply second law of thermodynamics
			CO204.4	Understand concept of air standad cycles
			CO204	
	Manufacturing Process -I	CO205	CO205.1	understand the basic concept of foundry process and related activities
			CO205.2	understand the concept of complete sand casting process with advance casting methods
			CO205.3	uderstand the fundamentals of welding process
			CO205.4	understand verious processes like electroplating, anodizing etc and its improtance in industry
			CO205.5	understand, apply and demonstrate basics of casting, foundary & welding processes
4	Basic Electric Drives and Control	CO206	CO206.1	Understand the working of electrical drives and their components
			CO206.2	Understand the basics of DC motors and their characteristics
			CO206.3	Understand the working of AC motors, induction motors and concept of braking
			CO206.4	Understand the different speed control methods of A.C. and D.C. motors

			CO206.5	Understand the design of transducers and their applications and the industrial applications of different drives
			CO206.6	Understand and demonstrate electric drives, their working with various transducers and controls
	Engineering Metallurgy	CO207	CO207.1	Understand the concept of metals and its physical and metallurgical properties
			CO207.2	Understand concept of steels alloy steels cast irons and non ferrous alloys
			CO207.3	Demonstrate the knowledge of verious heat treatment of metals
			CO207.4	Demonstrate the knowledge of applications of steels, cast irons, nonferrous alloys, mechanical properties of metals in industries
			CO207.5	Demonstrsaste the knowledge of identifying the micro sttructures of various ferrous & non-ferrous metals
	Energy Conversion-I	CO208	CO208.1	Understaand the concept of pure substance, properties of steam and its behaviour during various thermodynamic process.
			CO208.2	Understand working of powerplant, analyze & remember working of different boilers,Safety mountings, control mountings & acessories.
			CO208.3	Analyze flow of steam through nozzles & diffusers
			CO208.4	Evaluate the power developed by different turbines with steam as working fluid by different turbines with steam as working fluid by graphical & analytical method
			CO208.5	Understand construction & working of different types of condensers & cooling towers
			CO208.6	study the concepts & acquire knowledge of various components in steampower plant like bioler, mountings ,accessories ,condensors, turbines
	Manufacturing Processes -II	CO209	CO209.1	Understand the basic concept of metal cutting and various manufacturing processes
			CO209.2	Demonstrate the knowledge of lathe and its various operations
			CO209.3	Demonstrate the knowledge of drilling, boring, milling and gear production machines
			CO209.4	understand the working and knowledge of coventional machine like slotter, plainner, grinder and shapper machines.
			CO209.5	Understand the various unconventional machining processes
			CO209.6	Demonstrate the operations on lathe machines, plainner, shapper ,grinding, drilliing and milling machines.
	MDD-I	CO210	CO210.1	Student will be able to demonstrate the techniques of sactioning and visualising the objects

			CO210.2	Student will be able to develop machine component surfaces in order to fabricate them
			CO210.3	Considerations to design different machine components
			CO210.4	Student will be able to duplicate the design procudure for designing different mechanical joints
5	Production Technology	CO301	CO301.1	Knowledge of quality and quality management
			CO301.2	Application of statistical quality control tools
			CO301.3	Estimation of process capability
			CO301.4	Knowlede and application of work study techniques
			CO301.5	Design of inspection gauges
			CO301.6	Use of various inspection instruments
	HT	CO302	CO302.1	Apply the concept of heat transfer, laws of heat transfer and various mathematical equations
			CO302.2	Demonstrate the knowledge of determining the thermal conductivity of various materials
			CO302.3	Understanding and verifying various laws of radiation
			CO302.4	Estimation of Forced and Free convection
			CO302.5	Capable to explain the concept of heat exchanger and demonstrate the calculations of efficiency
	MS	CO303	CO303.1	Exhibit the concept of measurment system and to know its importance in industries
			CO303.2	Ability to measure various parameters like presure flow, speed, vibrations etc
			CO303.3	Ability to use verious measuring instruments
			CO303.4	Exhibit process approach of engineering and will confident in industry
			CO303.5	Demonstrate good skills in project work
	TOM-I	CO304	CO304.1	To understand the concept and its application of link, mechanism and machines
			CO304.2	To analyse the mechanism and machines on the basis of velocity and accelaration method
			CO304.3	To apply the use of synthesis of mechanism
			CO304.4	To evaluate and understand brake cluth dynometer gear train etc
			CO304.5	To create and evaluate of minimum projection
			CO304.6	Design linkage, cam and gear mechanisms for a given motion or a given input/output motion or force relationship, identify the basic relations between velocity & acceleration and use graphical and analytic methods to study the motions of various mechanisms
6	Computer Software Applications I Lab	CO305	CO305.1	Student will be able to understand and use the basic commands of drafting package
			CO305.2	Student will be able to understand 2D and 3D commands and develop a model in any Modeling software

			CO305.3	Student will be able to prepare assembly in any modeling software
			CO305.4	Student will be able to model sheet metal component in modeling software
	FP-II	CO306	CO306.1	Understand basic concept of prime movers
			CO306.2	Understand power produced with hydraulic machine
			CO306.3	Design of power conservation and devices
			CO306.4	Design hydraulic machine with high frequecy
			CO306.5	Understand concept of hydrostatic and hydrokinetic system
			CO306.6	Understand and apply the concept of prime movers, hydraulic machine, pump and demonstrate prime movers and hydraulic pumps
	Computer Software Applications	CO307	CO307.1	Student will able to understand and memorize the basics of DBMS
			CO307.2	Student will develop an ability to develop design of relational database
			CO307.3	Student will command over the MYSQL and perform relational algebra operation
			CO307.4	Student will articulate the simulation language and simulation packages
			CO307.5	Student will demonstrate the steps applied in simulation process
	Control System Engineering	CO312	CO308.1	Understand the basic concept and study different types of system
			CO308.2	Understand the concept of transient response analysis and will apply in numerical methods
			CO308.3	To knowledge of Industrial controllers and basic control actions of system
			CO308.4	Understand the concept of frequency response analysis method and use bode plot diagram in solving analytical problems
	Theory of Machines-II	CO313	CO309.1	To understand static force analysis and hydrodynamic lubrication
			CO309.2	Knowledge of analysis dynamic force analysis problem
			CO309.3	To apply knowledge of space mechanism and vehicle dynamics
			CO309.4	To understand the concept of vibrations and torsional vibration
			CO309.5	To remember and understand balancing
			CO309.6	Understand and apply knowledge of force analysis, space mechanism, vibrations and balancing of machinery
	Comm. Skill	CO314	CO310.1	Able to use language accurately fluently and appropriately
			CO310.2	Show their skills of listening understanding and interpreating
			CO310.3	Write project report, reviews resumes

			CO310.4	able to expresss their ideas relevant to given topics
			CO310.5	Exhibit skill of interview debeating and discussion
			CO310.6	Developing confidence smartness and outword skills as a techo-managerpossessing both the qualities i.e. professional and soft skills of communication
7	Machine Design and Drawing-II	CO401	CO401.1	To remember and understand key, shaft, coupling for industrial applications
			CO401.2	To design and analyze bearings
			CO401.3	To apply, evaluate and select types of drives
			CO401.4	To understand, design and analyze I.C. engines parts and governors
	Energy Conversion-II	CO402	CO402.1	Remembering the applications of various energy conversion machines
			CO402.2	Understanding the working of machine like compressors, refrigerators, Air conditioners
			CO402.3	Applying technical knowledge to choose appropriate energy conversion device for specific applications
			CO402.4	To analyze nuclear and renewable energy scenario in India
			CO402.5	To evaluate the performance of various machine like compressors, refrigerator
			CO402.6	Undrstand, analyze applications of various energy conversion machines like compressors, refrigerators, Air conditioners and evaluate the performance of various machine like compressors, refrigerator
			CO402	
	Industrial Management & Costing	CO403	CO403.1	Understand the functions of management and setup of organization structure
			CO403.2	Understand and demonstrate marketing and human resource management skills
			CO403.3	Demonstrate the knowledge of materials management and inventory control
			CO403.4	Exhibits the knowledge of cost estimation costing, financial management
			CO403	
	Automation Engineering	CO404	CO404.1	Concept of automation and its importance to industry and society automated flow line, line balancing
			CO404.2	Create the skill of NC/CNCprograms
			CO404.3	Apply to develop the working model of robots
			CO404.4	Understand the concept of GT and its applications in FMS
			CO404.5	The concept of CAPP and its application in FMS, Fundamentals of CIM components of CIM and automation in inspection
			CO404.6	Understand the application of Line balancing, CNC, Robot anotomy, Group Technology, CAPP, FMS AND CIM
			CO404	
	NES	CO405	CO405.1	Create awareness about NCES

			CO405.2	Acquire the depth knowledge of NCES
			CO405.3	Understand the construction and performance of NCES
			CO405.4	Develop and utilize NCES
			CO405.5	Analyze the systems performance by using renewable Energies
			CO405.6	Evaluate conversion efficiency of renewable energies
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	Tool Engineering	CO406	CO406.1	Apply the basic machine concept for tool life improvement during machining operation
			CO406.2	Design the various cutting tools and analyze the various cutting operations from tool design point
			CO406.3	Evaluate the need for implementation of mass production tools like jigs, fixtures, press tools
			CO406.4	Remember and apply the various concepts in location and clamping in industry
			CO406.5	Understand and remember working of various types of press tools and Improve productivity through knowledge of tool design
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	IC engines	CO407	CO407.1	Remembering type of engine, cycle analysis and losses in engines
			CO407.2	Understanding working of various types of engines and its compatibility with fuels
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Prof. Ram Meghe Institute of Technology & Research, Badnera

Department of Mechanical Engineering

List of COs 2020-21

Semester	Subject Name	Course Code	COs code	Course Outcomes
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			19COF101.3	Compare real and imaginary equations and evaluate it.
			19COF101.4	Solve certain types of differential equations and utilize it for engineering problems of electronics, electrical circuit.
			19COF101.5	Determine infinite series and their convergence and divergence.
	Engineering Physics	19COF102	19COF102.1	The students will be able to classify semiconductors and explain the working of diodes using band theory of solids.
			19COF102.2	The students will be able to apply the knowledge of Quantum physics, Compton scattering, de-Broglie's matter waves, Heisenbergs Uncertainty Principle.
			19COF102.3	The students will be able to utilize knowledge of electric and magnetic fields in mass spectrograph and cathode ray oscilloscope.
			19COF102.4	The students will be able to understand and utilize the knowledge of interference & diffraction of light, optical fibers and lasers.
			19COF102.5	The students will make use of the knowledge of fluid dynamics , ultrasonic waves and acoustics in various applications.
			19COF102.6	The students will be able to develope experimental skills and identify the appropriate application of particular experiment.
	Engineering Mechanics	19COF 103	19COF 103.1	Organize and solve the forces along with its effect.
			19COF 103.2	Apply principles of statics to the system of rigid bodies to solve simple structures.
			19COF 103.3	Determine frictional forces for simple contacts, wedges and in coil friction.
			19COF 103.4	Evaluate centroid & moment of inertia for 2-D structures.
			19COF 103.5	Utilise the kinematic and kinetic equations.
			19COF 103.6	Elaborate the concepts related to engineering mechanics, determine the lifting machine parameters and prove it graphically.

	COMPUTER PROGRAMMING	19COF104	19COF l 04.1	Explain the fundamental of computer and computing concepts.
			19COF l 04.2	Discuss the fundamental of C language.
			19COF l 04.3	Illustrate the use of operators, expression and input-output operations.
			19COF l 04.4	Explain conditional branching, iteration and jumping statement.
			19COF l 04.5	Design functions, pointer, array & structures, use of string & file concepts.
			19COF l 04.6	Apply programming concepts to solve real life programming problems.
	Workshop Practice 1A5	19COF105	19COF105.1	Upon completion of this course, the students will be able to Expain and Demonstrate different manufacturing processes which are commonly appyled in industry.
			19COF105.2	How to devlop the components using various manufacturing techniques.
			19COF105.3	Analyze dimensional accuracy and match tolerances.
			19COF105.4	Design and will model of various prototypes in the Smity such as forming square/ hexagonal head bolt and hook.
			19COF105.5	Create different Jobs in Fitting such as filing hack saw cutting, drilling and tapping.
			19COF105.6	Applying knowledge of foundry suchs as and molding, patterns , types of molding sands.
1st Year Group B	Mathematics II	19COF l 06	19COF l 06.1	Make use of system of equations in matrix forms.
			19COF l 06.2	Find the periodic functions as an infinite series.
			19COF l 06.3	Solve integral by Beta, Gamma functions and reduction formulae.
			19COF l 06.4	Construct a curve from equation and apply differentiation under integral sign.
			19COF l 06.5	Evaluate double integral, triple integral and its applications.
	Engineering Chemistry	19COF107	19COF107.1	Describe properties of hard water, its disadvantages and various softening processes of water use for generation of steam.
			19COF107.2	Identify various types of corrosion, mechanism and control methods to protect metal and explain energy storage system and its applications.
			19COF107.3	Apply the knowledge of useful engineering materials such as cement, lubricant, industrial and polymeric materials.
			19COF107.4	Apply the knowledge of properties of chemical fuel based on analysis and numerical data.

			19COF107.5	Identify the various phases of system and complex compound by using thermodynamic variables and describe various spectrophotometric technique.
			19COF107.6	Determine the properties of useful engineering materials such as water, chemical fuel, lubricant based on laboratory technique.
	Basic Electrical Engineering	19COF10	19COF108.1	Find basic parameters of DC circuits like voltage, currents and resistance using theorems and transformation techniques.
			19COF108.2	Explain the different properties of electromagnets and phenomenon of electromagnetic induction in magnetic circuits.
			19COF108.3	Utilize the different terms of AC so as to build series and parallel AC circuits.
			19COF108.4	Simplify three phase system using star and delta connection to balance three phase load in high voltage applications.
			19COF108.5	Compare types and characteristics of Transformers as well as DC motors to decide their exact field of applications.
			19COF108.6	Discuss about the use of measuring instruments and safety precautions so as to operate electrical equipments and experimental kits in real time applications.
	Engineering Graphics	19COF109	19COF109. 1	Make use of the drawing instruments effectively to dimension the given figures.
			19COF109. 2	Explain the methods of projection.
			19COF109. 3	Define the sectional views of solids such as Prism, Pyramid, Cone, Cylinder & Cube.
			19COF109. 4	Identify the pictorial views of the object.
			19COF109. 5	Construct isometric scale, isometric projection & views.
			19COF109. 6	Develop the lateral surfaces of primitive solids by using CAD Software.
	English Communication Skill Lab	19COF110	19COF110.1	Recall the fundamental concepts of English language for communication purpose.
			19COF110.2	Demonstrate their ability to discuss in English language.
			19COF110.3	Develop their communication skills through group discussion.
			19COF110.4	Simplify their presentation skill through reading comprehension and extempore.
			19COF110.5	Find effective textual contents for improved communication through story and article writing.
			19COF110.6	Elaborate effective ways for healthy conversation to make their point of views clear to the listeners.
3	MIII	C201	C201.1	Make use of various methods to solve linear differential equation.

			C201.2	Evaluate Laplace Transform by making use of properties and differential equation by Laplace transform method.
			C201.3	Identify and solve partial differential equation of first order and to apply Empirical laws to given data from observation connecting to two variables.
			C201.4	Determine analytic function, Taylor and Laurent's series.
			C201.5	Solve polynomial equations, system of linear equations and differential equation by different method.
			C201.6	Apply the knowledge of vector calculus to solve physical problem
	Mechanics of Material	C202	C202.1	To develop theoretical basis for stress, strain concept in various components under study
			C202.2	To study mechanical behavior of engineering material
			C202.3	To familiarize about finding shear force, bending moment, torsion, slope and deflection of various types of beams with different loading conditions
			C202.4	To build the necessary background to apply the knowledge of mechanics of materials on engineering applications
	Fluid Mechanics	C203	C203.1	Identify importance of various fluid properties at rest and in motion
			C203.2	Derive and apply general governing equation for various fluid flows
			C203.3	Understand the concept of boundary layer theory and flow seperation
			C203.4	Calculate energy losses in pipe flow
			C203.5	Evaluate the performance characteristics of hydraullic jets
			C203	
	Enineering Thermodynamics	C204	C204.1	Understand the basic concepts of thermodynamics, thermodynamic systems, work and heat
			C204.2	Apply first law of thermodynamics and application of first law to flow and non-flow processes
			C204.3	Apply second law of thermodynamics and understand concept of entropy
			C204.4	Understand the properties of steam, work done and heat transfer during various thermodynamics processes with steam as working fluid
			C204.5	Understand the concept of air standard cycles
	Manufacturing Process	C205	C205.1	basic concept of foundry process and related activities
			C205.2	concept of complete sand casting process with advance casting methods
			C205.3	fundamentals of welding processes

			C205.4	various processes like electroplating, anodizing etc and their importance in industries
	Manufacturing Process- Lab	C206	C206.1	Understand and apply knowlegde of operations related to foundry
			C206.2	Demonstrate various operations on related to joining processes
	Mechanics of Material- Lab	C207	C207.1	To understand the concept of stress and test effect of various Stresses on metal and materials
			C207.2	To understand the concept and Test the Beam at different loading condition and springs for stiffness
	Fluid Mechanics-Lab	C208	C208.1	Understand and demonstrate various fluid properties at rest and in motion
			C208.2	Derive and apply general governing equation for various fluid flows
	Machine Drawing Lab	C209	C209.1	Demonstrate the techniques of sectioning and visualizing the objects
			C209.2	Imagine, understand and sketch the missing views
			C209.3	Develop surfaces of objects and apply knowledge during their fabrication
4			C209.4	Understand the concept of intersection of solid objects
			C209.5	Understand and apply the conventions for materials and parts used in industries
			C209.6	Prepare detail machine assembly drawings
	Basic Electric Drives and Control	C210	C210.1	Understand the working of electrical drives and their components
			C210.2	Understand the basics of DC motors and their characteristics
			C210.3	Understand the working of AC motors, induction motors and concept of braking
			C210.4	Understand the different speed control methods of A.C. and D.C. motors
			C210.5	Understand the design of transducers and their applications
			C210.6	Understand the industrial applications of different drives
	Material Science	C211	C211.1	Students will understand the basic concepts of metallurgy & types of materials
			C211.2	Students will understand the iron-Carbon equillibrium diagram, critical temperatures, formation of microstructures and they will get the knowledge of alloys
			C211.3	Students will understand the uses and practical applications of ferrous & non-ferrous materials
			C211.4	Students will understand the various heat treatment processes, powder metallurgy and industrial applications
	Energy Conversion-I	C212	C212.1	Students will study the concept steam and steam power plant, mounting and accessories.

			C212.2	Students will demonstrate the calculation of various efficiency & related parameters.
			C212.3	Student will show the adequate knowledge of fuel & ash handling systems.
			C212.4	Students will demonstrate the knowledge of condenser & application.
			C212.5	Students will understand the concepts of steam nozzles & steam turbine
	Manufacturing Technology	C213	C213.1	Apply knowledge of theory of metal cutting, tool selection & Calculation cutting forces.
			C213.2	Demonstrate the knowledge of basis of turning operathins
			C213.3	understand the drillind and boring operation and working of drilling machines.
			C213.4	Understand the milling and gear cutting operations and working of respective machines
			C213.5	understand the working and knowledge of coventional machine, slotter, plainner, grinder and shapper machines.
			C213.6	Demonstrate the operations in lathe machines, plainner, shapper ,grinder, drillind, and milling machines.
	Hydraulics & Pneumatics System	C214	C214.1	Demonstrate basic concepts of prime movers and turbines
			C214.2	Utilize the knowledge of centrifugal and reciprocating pumps for applications
			C214.3	Reveal the importance of other water lifting devices
			C214.4	Solve the elementary treatment on compressible fluid flow
			C214.5	Understand the concept of hydrostatic and hydrokinetic systems
			C214.6	Use the knowledge of hydraulics & pneumatics in developing project work
	Basic Electric Drives and Control- Lab	C215	C215.1	Understand the working of electrical drives and their components
			C215.2	Understand the basics of DC motors and their characteristics
	Material Science Lab	C216	C216.1	Demonstrsaste the knowledge of identifying the micro sttructures of various ferrous & non-ferrous metals
			C216.2	Demonstrate the knowledge of verious heat treatment processes
	Manufacturing Technology - Lab	C217	C217.1	Understand and apply knowlegde of operations related to lathe, shaper, slotter, drilling & grinding m/cs
			C217.2	Demonstrate various operations on lathe and shaper

	Hydraulics & Pneumatics System- Lab	C218	C218.1	Demonstrate basic concepts of prime movers and turbines
5	MQC		C218.2	Demonstrate basic concepts of Hydraulic machines
		CO301	CO301.3	Estimation of process capability
			CO301.4	Knowlede and application of work study techniques
			CO301.5	Design of inspection gauges
			CO301.6	Use of various inspection instruments
	HT	CO302	CO302.1	Apply the concept of heat transfer, laws of heat transfer and various mathematical equations
			CO302.2	Demonstrate the knowledge of determining the thermal conductivity of various materials
			CO302.3	Understanding and verifying various laws of radiation
			CO302.4	Estimation of Forced and Free convection
			CO302.5	Capable to explain the concept of heat exchanger and demonstrate the calculations of efficiency
			CO302.6	Understand and evaluate various modes of heat transfer processes
			CO302	
	MS	CO303	CO303.1	Exhibit the concept of measurment system and to know its importance in industries
			CO303.2	Ability to measure various parameters like presure flow, speed, vibrations etc
			CO303.3	Ability to use verious measuring instruments
			CO303.4	Exhibit process approach of engineering and will confident in industry
			CO303.5	Demonstrate good skills in project work
			CO303	
	TOM-I	CO304	CO304.1	To understand the concept and its application of link, mechanism and machines
			CO304.2	To analyse the mechanism and machines on the basis of velocity and accelaration method
			CO304.3	To apply the use of synthesis of mechanism
			CO304.4	To evaluate and understand brake cluth dynometer gear train etc
			CO304.5	To create and evaluate of minimum projection
			CO304.6	Design linkage, cam and gear mechanisms for a given motion or a given input/output motion or force relationship, identify the basic relations between velocity & acceleration and use graphical and analytic methods to study the motions of various mechanisms
			CO304	
	Computer Software Applications I Lab	CO305	CO305.1	Student will be able to understand and use the basic commands of drafting package

			CO305.2	Student will be able to understand 2D and 3D commands and develop a model in any Modeling software
			CO305.3	Student will be able to prepare assembly in any modeling software
			CO305.4	Student will be able to model sheet metal component in modeling software
			CO305	
6	FP-II	CO306	CO306.1	Understand basic concept of prime movers
			CO306.2	Understand power produced with hydraulic machine
			CO306.3	Design of power conservation and devices
			CO306.4	Design hydraulic machine with high frequecy
			CO306.5	Understand concept of hydrostatic and hydrokinetic system
			CO306.6	Understand and apply the concept of prime movers, hydraulic machine, pump and demonstrate prime movers and hydraulic pumps
			CO306	
	Computer Software Applications	CO307	CO307.1	Student will able to understand and memorize the basics of DBMS
			CO307.2	Student will develop an ability to develop design of relational database
			CO307.3	Student will command over the MYSQL and perform relational algebra operation
			CO307.4	Student will articulate the simulation language and simulation packages
			CO307.5	Student will demonstrate the steps applied in simulation process
			CO307	
	Control System Engineering	CO312	CO308.1	Understand the basic concept and study different types of system
			CO308.2	Understand the concept of transient response analysis and will apply in numerical methods
			CO308.3	To knowledge of Industrial controllers and basic control actions of system
			CO308.4	Understand the concept of frequency response analysis method and use bode plot diagram in solving analytical problems
			CO308	
	Theory of Machines-II	CO313	CO309.1	To understand static force analysis and hydrodynamic lubrication
			CO309.2	Knowledge of analysis dynamic force analysis problem
			CO309.3	To apply knowledge of space mechanism and vehicle dynamics
			CO309.4	To understand the concept of vibrations and torsional vibration
			CO309.5	To remember and understand balancing

			CO309.6	Understand and apply knowledge of force analysis, space mechanism, vibrations and balancing of machinery
			CO309	
	Comm. Skill	CO314	CO310.1	Able to use language accurately fluently and appropriately
			CO310.2	Show their skills of listening understanding and interpreating
			CO310.3	Write project report, reviews resumes
			CO310.4	able to expresss their ideas relevant to given topics
			CO310.5	Exhibit skill of interview debeating and discussion
			CO310.6	Developing confidence smartness and outword skills as a techo-managerpossessing both the qualities i.e. professional and soft skills of communication
			CO310	
7	Machine Design and Drawing-II	CO401	CO401.1	To remember and understand key, shaft, coupling for industrial applications
			CO401.2	To design and analyze bearings
			CO401.3	To apply, evaluate and select types of drives
			CO401.4	To understand, design and analyze I.C. engines parts and governors
			CO401.5	
			CO401	
	Energy Conversion-II	CO402	CO402.1	Remembering the applications of various energy conversion machines
			CO402.2	Understanding the working of machine like compressors, refrigerators, Air conditioners
			CO402.3	Applying technical knowledge to choose appropriate energy conversion device for specific applications
			CO402.4	To analyze nuclear and renewable energy scenario in India
			CO402.5	To evaluate the performance of various machine like compressors, refrigerator
			CO402.6	Undrstand, analyze applications of various energy conversion machines like compressors, refrigerators, Air conditioners and evaluate the performance of various machine like compressors, refrigerator
			CO402	
	Industrial Management & Costing	CO403	CO403.1	Understand the functions of management and setup of organization structure
			CO403.2	Understand and demonstrate marketing and human resource management skills
			CO403.3	Demonstrate the knowledge of materials management and inventory control
			CO403.4	Exhibits the knowledge of cost estimation costing, financial management
			CO403	

	Automation Engineering	CO404	CO404.1	Concept of automation and its importance to industry and society automated flow line, line balancing
			CO404.2	Create the skill of NC/CNCprograms
			CO404.3	Apply to develop the working model of robots
			CO404.4	Understand the concept of GT and its applications in FMS
			CO404.5	The concept of CAPP and its application in FMS, Fundamentals of CIM components of CIM and automation in inspection
			CO404.6	Understand the application of Line balancing, CNC, Robot anotomy, Group Technology, CAPP, FMS AND CIM
			CO404	
	NES	CO405	CO405.1	Create awareness about NCES
			CO405.2	Acquire the depth knowledge of NCES
			CO405.3	Understand the construction and performance of NCES
			CO405.4	Develop and utilize NCES
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List of Cos_2021-22

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	Engineering Physics	19COF102	19COF102.1	The students will be able to classify semiconductors and explain the working of diodes using band theory of solids.
			19COF102.2	The students will be able to apply the knowledge of Quantum physics, Compton scattering, de-Broglie's matter waves, Heisenbergs Uncertainty Principle.
			19COF102.3	The students will be able to utilize knowledge of electric and magnetic fields in mass spectrograph and cathode ray oscilloscope.
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			19COF102.6	The students will be able to develope experimental skills and identify the appropriate application of particular experiment.
	Engineering Mechanics	19COF 103	19COF 103.1	Organize and solve the forces along with its effect.
			19COF	Apply principles of statics to the system of rigid bodies

			103.2	to solve simple structures.
			19COF 103.3	Determine frictional forces for simple contacts, wedges and in coil friction.
			19COF 103.4	Evaluate centroid & moment of inertia for 2-D structures.
			19COF 103.5	Utilise the kinematic and kinetic equations.
			19COF 103.6	Elaborate the concepts related to engineering mechanics, determine the lifting machine parameters and prove it graphically.
	COMPUTER PROGRAMMING	19COF104	19COF 104.1	Explain the fundamental of computer and computing concepts.
			19COF 104.2	Discuss the fundamental of C language.
			19COF 104.3	Illustrate the use of operators, expression and input-output operations.
			19COF 104.4	Explain conditional branching, iteration and jumping statement.
			19COF 104.5	Design functions, pointer, array & structures, use of string & file concepts.
			19COF 104.6	Apply programming concepts to solve real life programming problems.
	Workshop Practice 1A5	19COF105	19COF105.1	Upon completion of this course, the students will be able to Expain and Demonstrate different manufacturing processes which are commonly appyled in industry.
			19COF105.2	How to devlop the components using various manufacturing techniques.
			19COF105.3	Analyze dimensional accuracy and match tolerances.
			19COF105.4	Design and will model of various prototypes in the Smity such as forming square/ hexagonal head bolt and hook.
			19COF105.5	Create different Jobs in Fitting such as filing hack saw cutting, drilling and tapping.
			19COF105.6	Applying knowledge of foundry suchs as and molding, patterns , types of molding sands.

1st Year Group B	Mathematics II	19COF l 06	19COF l 06.1	Make use of system of equations in matrix forms.
			19COF l 06.2	Find the periodic functions as an infinite series.
			19COF l 06.3	Solve integral by Beta, Gamma functions and reduction formulae.
			19COF l 06.4	Construct a curve from equation and apply differentiation under integral sign.
			19COF l 06.5	Evaluate double integral, triple integral and its applications.
	Engineering Chemistry	19COF107	19COF107.1	Describe properties of hard water, its disadvantages and various softening processes of water use for generation of steam.
			19COF107.2	Identify various types of corrosion, mechanism and control methods to protect metal and explain energy storage system and its applications.
			19COF107.3	Apply the knowledge of useful engineering materials such as cement, lubricant, industrial and polymeric materials.
			19COF107.4	Apply the knowledge of properties of chemical fuel based on analysis and numerical data.
			19COF107.5	Identify the various phases of system and complex compound by using thermodynamic variables and describe various spectrophotometric technique.
			19COF107.6	Determine the properties of useful engineering materials such as water, chemical fuel, lubricant based on laboratory technique.
	Basic Electrical Engineering	19COF10	19COF108.1	Find basic parameters of DC circuits like voltage, currents and resistance using theorems and transformation techniques.
			19COF108.2	Explain the different properties of electromagnets and phenomenon of electromagnetic induction in magnetic circuits.
			19COF108.3	Utilize the different terms of AC so as to build series and parallel AC circuits.
			19COF108.4	Simplify three phase system using star and delta connection to balance three phase load in high voltage applications.

			19COF108.5	Compare types and characteristics of Transformers as well as DC motors to decide their exact field of applications.
			19COF108.6	Discuss about the use of measuring instruments and safety precautions so as to operate electrical equipments and experimental kits in real time applications.
	Engineering Graphics	19COF109	19COF109.1	Make use of the drawing instruments effectively to dimension the given figures.
			19COF109.2	Explain the methods of projection.
			19COF109.3	Define the sectional views of solids such as Prism, Pyramid, Cone, Cylinder & Cube.
			19COF109.4	Identify the pictorial views of the object.
			19COF109.5	Construct isometric scale, isometric projection & views.
			19COF109.6	Develop the lateral surfaces of primitive solids by using CAD Software.
	English Communication Skill Lab	19COF110	19COF110.1	Recall the fundamental concepts of English language for communication purpose.
			19COF110.2	Demonstrate their ability to discuss in English language.
			19COF110.3	Develop their communication skills through group discussion.
			19COF110.4	Simplify their presentation skill through reading comprehension and extempore.
			19COF110.5	Find effective textual contents for improved communication through story and article writing.
			19COF110.6	Elaborate effective ways for healthy conversation to make their point of views clear to the listeners.
3	**MIII**	C201	C201.1	Make use of various methods to solve linear differential equation.
			C201.2	Evaluate Laplace Transform by making use of properties and differential equation by Laplace transform method.

			C201.3	Identify and solve partial differential equation of first order and to apply Empirical laws to given data from observation connecting to two variables.
			C201.4	Determine analytic function, Taylor and Laurent's series.
			C201.5	Solve polynomial equations, system of linear equations and differential equation by different method.
			C201.6	Apply the knowledge of vector calculus to solve physical problem
	Mechanics of Material	C202	C202.1	To develop theoretical basis for stress, strain concept in various components under study
			C202.2	To study mechanical behavior of engineering material
			C202.3	To familiarize about finding shear force, bending moment, torsion, slope and deflection of various types of beams with different loading conditions
			C202.4	To build the necessary background to apply the knowledge of mechanics of materials on engineering applications
	Fluid Mechanics	C203	C203.1	Identify importance of various fluid properties at rest and in motion
			C203.2	Derive and apply general governing equation for various fluid flows
			C203.3	Understand the concept of boundary layer theory and flow seperation
			C203.4	Calculate energy losses in pipe flow
			C203.5	Evaluate the performance characteristics of hydraullic jets
			C203	
	Enineering Thermodynamics	C204	C204.1	Understand the basic concepts of thermodynamics, thermodynamic systems, work and heat
			C204.2	Apply first law of thermodynamics and application of first law to flow and non-flow processes
			C204.3	Apply second law of thermodynamics and understand concept of entropy
			C204.4	Understand the properties of steam, work done and heat transfer during various thermodynamics processes with steam as working fluid
			C204.5	Understand the concept of air standard cycles
	Manufacturing Process	C205	C205.1	basic concept of foundry process and related activities
			C205.2	concept of complete sand casting process with advance casting methods
			C205.3	fundamentals of welding processes
			C205.4	various processes like electroplating, anodizing etc and their importance in industries

	Manufacturing Process- Lab	C206	C206.1	Understand and apply knowlegde of operations related to foundry
			C206.2	Demonstrate various operations on related to joining processes
	Mechanics of Material- Lab	C207	C207.1	To understand the concept of stress and test effect of various Stresses on metal and materials
			C207.2	To understand the concept and Test the Beam at different loading condition and springs for stiffness
	Fluid Mechanics-Lab	C208	C208.1	Understand and demonstrate various fluid properties at rest and in motion
			C208.2	Derive and apply general governing equation for various fluid flows
	Machine Drawing Lab	C209	C209.1	Demonstrate the techniques of sectioning and visualizing the objects
			C209.2	Imagine, understand and sketch the missing views
			C209.3	Develop surfaces of objects and apply knowledge during their fabrication
4			C209.4	Understand the concept of intersection of solid objects
			C209.5	Understand and apply the conventions for materials and parts used in industries
			C209.6	Prepare detail machine assembly drawings
	Basic Electric Drives and Control	C210	C210.1	Understand the working of electrical drives and their components
			C210.2	Understand the basics of DC motors and their characteristics
			C210.3	Understand the working of AC motors, induction motors and concept of braking
			C210.4	Understand the different speed control methods of A.C. and D.C. motors
			C210.5	Understand the design of transducers and their applications
			C210.6	Understand the industrial applications of different drives
	Material Science	C211	C211.1	Students will understand the basic concepts of metallurgy & types of materials
			C211.2	Students will understand the iron-Carbon equillibrium diagram, critical temperatures, formation of microstructures and they will get the knowledge of alloys
			C211.3	Students will understand the uses and practical applications of ferrous & non-ferrous materials
			C211.4	Students will understand the various heat treatment processes, powder metallurgy and industrial applications
	Energy Conversion-I	C212	C212.1	Students will study the concept steam and steam power plant, mounting and accessories.

			C212.2	Students will demonstrate the calculation of various efficiency & related parameters.
			C212.3	Student will show the adequate knowledge of fuel & ash handling systems.
			C212.4	Students will demonstrate the knowledge of condenser & application.
			C212.5	Students will understand the concepts of steam nozzles & steam turbine
	Manufacturing Technology	C213	C213.1	Apply knowledge of theory of metal cutting, tool selection & Calculation cutting forces.
			C213.2	Demonstrate the knowledge of basis of turning operathins
			C213.3	understand the drillind and boring operation and working of drilling machines.
			C213.4	Understand the milling and gear cutting operations and working of respective machines
			C213.5	understand the working and knowledge of coventional machine, slotter, plainner, grinder and shapper machines.
			C213.6	Demonstrate the operations in lathe machines, plainner, shapper ,grinder, drillind, and milling machines.
	Hydraulics & Pneumatics System	C214	C214.1	Demonstrate basic concepts of prime movers and turbines
			C214.2	Utilize the knowledge of centrifugal and reciprocating pumps for applications
			C214.3	Reveal the importance of other water lifting devices
			C214.4	Solve the elementary treatment on compressible fluid flow
			C214.5	Understand the concept of hydrostatic and hydrokinetic systems
			C214.6	Use the knowledge of hydraulics & pneumatics in developing project work
	Basic Electric Drives and Control- Lab	C215	C215.1	Understand the working of electrical drives and their components
			C215.2	Understand the basics of DC motors and their characteristics
	Material Science Lab	C216	C216.1	Demonstrsaste the knowledge of identifying the micro sttructures of various ferrous & non-ferrous metals
			C216.2	Demonstrate the knowledge of verious heat treatment processes
	Manufacturing Technology - Lab	C217	C217.1	Understand and apply knowlegde of operations related to lathe, shaper, slotter, drilling & grinding m/cs
			C217.2	Demonstrate various operations on lathe and shaper

	Hydraulics & Pneumatics System- Lab	C218	C218.1	Demonstrate basic concepts of prime movers and turbines
			C218.2	Demonstrate basic concepts of Hydraulic machines
5	**Metrology & Quality Control**	C301	C301.1	Create & apply the concept of inspection, quality control and its importance to industry
			C301.2	Demonstrate the skills of controlling various out of control processes using statistical quality control tools
			C301.3	Understand the importance of improving production and productivity using work study approach
			C301.4	Apply the knowledge of various measurement standards and techniques in the industry to measure various parameters related to metrology.
	HT	C302	C302.1	Apply the concept of heat transfer, laws of heat transfer and various mathematical equations
			C302.2	Demonstrate the knowledge of determining the thermal conductivity of various materials
			C302.3	Understanding and verifying various laws of radiation
			C302.4	Capable to explain the concept of heat exchanger and demonstrate the calculations of efficiency
	MS	C303	C303.1	Understand & apply the concept of measurement system and will know its importance related to the industry.
			C303.2	Demonstrate the ability to measure various parameters like pressure, flow, speed, vibration etc.
			C303.3	Understand to use various measuring instruments.
			C303.4	Understand the practical approach of engineering and will be confident in industry.
	KOM	C304	C304.1	Understand & apply the concept and its applications of link, mechanisms and machines.
			C304.2	Demonstrate the ability to analyze the mechanisms and machines on the basis of velocity and acceleration and they will show the ability to solve analytical methods.
			C304.3	Show the ability to use graphical and analytical methods for synthesis of mechanisms to develop mini projects in the course duration.
			C304.4	Understand the practical for study of brake, clutch, dynamometer, gear train etc.
	HT Lab	C306	C306.1	Understand various modes of heat transfer
			C306.2	Evaluate various parameters of the heat transfer process
	MQC Lab	C307	C307.1	Explain the principles involved in measurement and inspection
			C307.2	Select and use appropriate measurement instrument for

				a given application
			C307.3	Apply the basics of sampling in the context of manufacturing
	KOM Lab	C308	C308.1	Design linkage, cam and gear mechanisms for a given motion or a given input/output motion or force relationship, identify the basic relations between velocity & acceleration and use graphical and analytic methods to study the motions of various mechanisms
	MS Lab	C309	C309.1	Choose appropriate measuring device for measurement of various quantities
			C309.2	Analyse the performance of various
			C309.3	Analyse and execute the calibration process for measuring instruments
6	Design of Machine Elements	C311	C311.1	Understand the concept of various stresses and apply the design procedure to riveted joints and welded joints.
			C311.2	Understand design procedure of knuckle joint, springs and power screw.
			C311.3	Analyze & select types of shafts, keys, couplings for various machines and industrial applications.
			C311.4	Analyze the various types of bearings and understand the design procedure of IC Engine parts.
	Control System Engineering	C312	C312.1	Understand the basic concept and study different types of system
			C312.2	Understand the concept of transient response analysis and will apply in numerical methods
			C312.3	To knowledge of Industrial controllers and basic control actions of system
			C312.4	Understand the concept of frequency response analysis method and use bode plot diagram in solving analytical problems
	Dynamics of Machine	C313	C313.1	Apply basic concept of static force analysis and lubrication mechanism.
			C313.2	Understand the knowledge of dynamic force analysis analytically and graphically.
			C313.3	Apply the knowledge of space mechanism and vehicle dynamics.
			C313.4	Understand concept of free vibration and force vibration, concept of Torsional vibration.
			C313.5	Analyze the concept of balancing of machinery
	Tool Engineering	C314	C314.1	Create the design of single and multi-point cutting tools.
			C314.2	Apply the knowledge related to machining in order to estimate tool life and selection of cutting fluids.
			C314.3	. Create the design of multipoint tools like twist drills, reamers, broach and milling cutters & press working dies like punching, blanking and drawing.

			C314.4	Analyze the real time problems of work holding by designing jigs and fixtures.
	Non-Conventional Energy Sources	C315	C315.1	Able to study the concept of renewable and non-renewable sources.
			C315.2	Apply the basic concept of solar energy utilization and storage.
			C315.3	Apply the concept of energy from ocean and wind.
			C315.4	Study the concept of bio-mass energy resources.
	Computer Aided Design & Simulation Lab	C316	C316.01	Understand the concept of CAD/ CAM and CIM .
			C316.02	Apply knowledge using CAD modeling for component design
			C316.03	Apply the knowledge of geometric transformation.
			C316.04	Understand the Mechanical & Manufacturing simulation systems
	Automobile Engineering	C317	C317.1	Understand the basics of automobile engineering and its components.
			C317.2	Analyze &develop about the cooling system and its function.
			C317.3	Understand basic concept of transmission system and types of gears box, basic concept of electrical system and ignition system.
			C317.4	Apply the knowledge of suspension and lubrication
	Design of Machine Elements-Lab	C318	C318.1	Design various machine elements like joints, springs, couplings etc, under various conditions
			C318.2	Convert design dimensions into working/manufacturing drawing
			C318.3	Use design data book/standard codes to standardize the designed dimensions
	Dynamics of Machines -Lab.	C319	C319.1	Apply basic concept of force analysis and lubrication mechanism.
			C319.2	Understand the knowledge of dynamic force analysis analytically and graphically.
			C319.3	Apply the knowledge of space mechanism and vehicle dynamics.
			C319.4	Understand concept of vibrations.
	Tool Engineering Lab	C320	C320.1	Create the design of single and multi-point cutting tools.
			C320.2	Create the design of multipoint tools like twist drills, reamers, broach and milling
			C320.3	cutters & press working dies like punching, blanking and drawing.
			C320.4	Analyze the real time problems of work holding by designing jigs and fixtures.

	Computer Aided Design & Simulation Lab	C321	C321.1	Understand the concept of CAD.
			C321.2	Apply knowledge using CAD modeling for component design
			C321.3	Apply the knowledge of geometric transformation.
			C321.4	Understand the Mechanical & Manufacturing simulation systems.
	Research Skills – Lab	C322	C322.1	Demonstrate a sound technical knowledge of their selected research topic.
			C322.2	Undertake problem identification, formulation and solution.
			C322.3	Design engineering solutions to complex problems utilizing a systems approach.
			C322.4	Conduct an engineering research.
			C322.5	Demonstrate the knowledge, skills and attitudes of a professional engineer
7	Machine Design and Drawing-II	C401	C401.1	To remember and understand key, shaft, coupling for industrial applications
			C401.2	To design and analyze bearings
			C401.3	To apply, evaluate and select types of drives
			C401.4	To understand, design and analyze I.C. engines parts and governors
			C401.5	
	Energy Conversion-II	C402	C402.1	Remembering the applications of various energy conversion machines
			C402.2	Understanding the working of machine like compressors, refrigerators, Air conditioners
			C402.3	Applying technical knowledge to choose appropriate energy conversion device for specific applications
			C402.4	To analyze nuclear and renewable energy scenario in India
			C402.5	To evaluate the performance of various machine like compressors, refrigerator
			C402.6	Undrstand, analyze applications of various energy conversion machines like compressors, refrigerators, Air conditioners and evaluate the performance of various machine like compressors, refrigerator
	Industrial Management & Costing	C403	C403.1	Understand the functions of management and setup of organization structure
			C403.2	Understand and demonstrate marketing and human resource management skills
			C403.3	Demonstrate the knowledge of materials management and inventory control
			C403.4	Exhibits the knowledge of cost estimation costing, financial management

	ATE	C404	C404.1	Concept of automation and its importance to industry and society automated flow line, line balancing
			C404.2	Create the skill of NC/CNCprograms
			C404.3	Apply to develop the working model of robots
			C404.4	Understand the concept of GT and its applications in FMS
			C404.5	The concept of CAPP and its application in FMS, Fundamentals of CIM components of CIM and automation in inspection
			C404.6	Understand the application of Line balancing, CNC, Robot anotomy, Group Technology, CAPP, FMS AND CIM
	NES	C405	C405.1	Create awareness about NCES
			C405.2	Acquire the depth knowledge of NCES
			C405.3	Understand the construction and performance of NCES
			C405.4	Develop and utilize NCES
			C405.5	Analyze the systems performance by using renewable Energies
			C405.6	Evaluate conversion efficiency of renewable energies
	Tool Engineering	C406	C406.1	Apply the basic machine concept for tool life improvement during machining operation
			C406.2	Design the various cutting tools and analyze the various cutting operations from tool design point
			C406.3	Evaluate the need for implementation of mass production tools like jigs, fixtures, press tools
			C406.4	Remember and apply the various concepts in location and clamping in industry
			C406.5	Understand and remember working of various types of press tools and Improve productivity through knowledge of tool design
			C406.6	Apply the basic machine concept for tool life improvement and Design the various cutting tools
8	ICE	C407	C407.1	Remembering type of engine, cycle analysis and losses in engines
			C407.2	Understanding working of various types of engines and its compatibility with fuels
			C407.3	To analyze various factors governing combustion phenomenon in engines
			C407.4	To evaluate the performance of engines under various operating conditions
			C407.5	Applying technical knowledge to curb vehicular pollution
			C407.6	To create the framework for evaluating the performance of engine

	ORT	C408	C408.1	Students will exhibits the basic knowledge of science, mathematics and engineering to formulate the real life situations into the OR problems and formulate OR models.
			C408.2	Students will be able to formulate LPP from the situations from production engineering and solve these LPPs for implementing the decisions.
			C408.3	Students will be able to formulate Transportation, Assignment, Sequencing, Queuing. Replacement problems and solve these problems by using the iterative methods.
			C408.4	Students will be able to formulate Network models for the projects and understand the use of network techniques- PERT and CPM for planning, scheduling and controlling of the projects.
			C408.5	Students will understand the concept of Simulation and how to use Monte Carlo simulation for various OR problems.
			C408.6	Students will be able to transfer abstract or therotical ideas to practical situations and apply their engineering khowledge to analyse the problems and evaluate the better alternatives.
	AE	C409	C409.1	Understand the basics of Automobile and its component
			C409.2	Identify different parts of Automobile
			C409.3	Explain the working of various parts
			C409.4	Describe how the steering suspension system operates
			C409.5	Understand the environmenal implications of Automobile engineering system operations
			C409.6	Understand the future development in Automoile Industry
	PPC	C410	C410.1	Importance of PPC its functions, Advantages
			C410.2	Calculations of sales forecasts using various forecasting methods
			C410.3	Criteria of batch size determination
			C410.4	Concept of machine capacity loading of machines and man machine activity charts.
			C410.5	Concept of inventory control and its systems
			C410.6	Modern techniques/Philosophies of management like CIM,JIT,MRP
	RAC	C411	C411.1	Understand basic concept of refrigeration process and VCR cycle
			C411.2	Understand compound compression and multi-evaporation system
			C411.3	Apply the knowledge of refrigeration components and controls
			C411.4	Apply the concept of Psychrometry and air

				conditioning system
			C411.5	Apply the concept of load calculation & Applied Psychrometry
			C411.6	Performance and evaulation of Conventional(VCRs,VARs) & Non conventional refrigreation(Cascade,Vortex tube refrigeration)
	Robotics	C412	C412.1	Understand the concept of robotics describe the robot anatomy
			C412.2	Demonstrate the knowledge of end effector and its types
			C412.3	Understand the concept of kinematics of robot and sensors
			C412.4	Remember the concept of robot programming
			C412.5	Apply the Knowledge of application of robot
			C412.6	Evaluate the analytical problems for selection of robots
	Project & Seminar	C413	C413.1	Apply the knowledge of engineering fundamentals for the solution of engineering problems
			C413.2	Ability to identify,formulat and analyse engineering problems using basic engeneering sciences and moder tools
			C413.3	To acquire knowledge to assess societal, health, safety, legal issues
			C413.4	Demonstrate knowledge for sustainable development using ethical practice
			C413.5	Develop ability to work as a leader and as a member of multi desiplinary
			C413.6	Ability to manage project and finance

HOD
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