



# MEENAKSHI SUNDARARAJAN ENGINEERING COLLEGE

363, Arcot Road, Kodambakkam, Chennai – 24  
Approved by AICTE & Affiliated to Anna University  
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Website : [www.msec.edu.in](http://www.msec.edu.in)

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## 2.6.1 Programme and course outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students

- The Institute provides a high-quality, all-encompassing education. The aim and mission of the Institute is to provide a conducive learning environment that helps the students to attain professional and personal growth in technical area.
- The effectiveness of the teaching learning process can be measured through learning outcomes and in turn, it can be achieved by mapping the **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)**.
- Program Educational Objectives (PEO), and Program Specific Outcomes (PSO) are clearly stated and displayed in each department's classrooms, corridors, faculty rooms, laboratories, as well as on the departmental webpage of the Institutional website ([www.msec.edu.in](http://www.msec.edu.in))
- All the students are apprised of the objectives and expected outcomes of their programme during the compulsory Orientation program. Students are also educated and provided with the detailed syllabus and course outcomes in each course and the assessment strategy for each course. The course outcomes are displayed in departmental web page of institutional website.

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The graduates in Civil Engineering will:

- **PO1 : Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and engineering specialization to the solution of complex engineering problems.
- **PO2 :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.
- **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.
- **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.

**Course Outcomes**

[Click for 2021 Regulation - UG Civil Engineering](#)  
[Click for 2017 Regulation - UG Civil Engineering](#)  
[Click for 2013 Regulation - UG Civil Engineering](#)  
[Click for 2017 Regulation - PG Construction Engineering Management](#)  
[Click for 2013 Regulation - PG Construction Engineering Management](#)

**Website Screenshot of Course Outcomes, PEOs and PSOs**

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
BE (CIVIL ENGINEERING)

## REGULATION – 2021 COURSE OUTCOMES (CO)

### HS3151-Professionals English [C101]

C101.1	To listen and comprehend complex academic texts.
C101.2	To read and infer the denotative and connotative meanings of technical texts.
C101.3	To write definitions, descriptions, narrations and essays on various topics.
C101.4	To speak fluently and accurately in formal and informal communicative contexts
C101.5	To express their opinions effectively in both oral and written medium of communication.

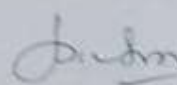
### MA3151-Matrices and Calculus [C102]

C102.1	To find eigenvalues and eigen vectors of a matrix ,diagonalize symmetric matrix.
C102.2	Acquire the knowledge of Limit definition and differentiation rules to differentiate the functions.
C102.3	Examine the concepts of functions of several variables and to find extremum value of a given function.
C102.4	Evaluate the integrals by using Riemann sum and Fundamental theorem of Calculus.
C102.5	Develop an ability to trace the curve and find area , volume using multiple integrals.

### PH3151-Engineering Physics [C103]

C103.1	Effectively understand the importance of Mechanics.
C103.2	Gain knowledge of electromagnetic waves and its applications.
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
C103.4	Understand the importance of quantum physics.
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
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## CY3151 -Engineering Chemistry [C104]

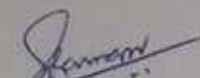
C104.1	Water treatment techniques will facilitate better understanding of engineering processes and applications for further learning
C104.2	The students will gain knowledge on the basics of properties of nano materials and its applications
C104.3	The students will acquire knowledge on the concepts of composites and phase rule and their applications in compound formation.
C104.4	The knowledge gained on engineering materials, fuels, energy sources will facilitate future learning
C104.5	The students will have adequate knowledge on the concepts of nuclear energy, batteries and their application in energy production


## GE3151- Problem Solving And Python Programming [C105]

C105.1	Develop algorithmic Designs to simple computational problems.
C105.2	Develop simple statements of python programs for mathematical Expressions.
C105.3	Implement control flow and function concepts for developing Python programs.
C105.4	Understanding Python data structures - lists, tuples & dictionaries for handling compound data.
C105.5	Handling files, exception, modules and packages in Python for solving problems.

## GE3171 – Problem Solving And Python Programming Laboratory – [C106]

C106.1	Develop algorithmic solutions to execute simple computational Python programs.
C106.2	Implement programs in Python using conditionals and loops for solving problems real time scenarios.
C106.3	Deploy functions to decompose a Python program in real time mathematical applications.
C106.4	Process compound data using Python data structures by Utilize Python packages in developing software applications.

  
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## BS3171– Physics And Chemistry Laboratory – [C107]

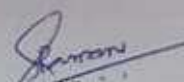
C107.1	The hands on exercises undergone by the students will help them to apply physics principles of optics Out filled with hands on knowledge about pH and conductometric titration
C107.2	Acquire knowledge about the modulus of elasticity and able to apply them in the field. The basic concepts on argentometric titration helps in fluoride estimation.
C107.3	Assess the behaviour of columns, beams and failures of materials. The basic idea on Potentiometric titration will help the adequate knowledge EMF measurement.


## HS3251 - Professional English - II [C108]

C108.1	Compare and Contrast the product and ideas and how to apply in their academic, professional and personal life.
C108.2	Identify cause and effects in events, industrial processes as well competency in reporting the events, documentaries, biographies, travelogue, news and technical blogs in oral and written communication.
C108.3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format and diction for accurate description of a process or product through all four skills(LSRW).
C108.4	Report events and the processes of technical and industrial nature and identify the core ideas of various topics in TED talks, scientific lectures, newspaper articles, journals and educational videos and give formal and informal presentations on the same
C108.5	Express and present their opinions, views and ideas diligently in debates, discussions and role plays, and draft clear & concise recommendations and newspaper articles in a logical manner.

## MA3251 - Statistics and Numerical Methods [C109]

C109.1	Analyse the statistical data and apply various small and large sample test for testing the hypothesis.
C109.2	Adapt Design of Experiments using analysis of variance to test the hypothesis.
C109.3	Use numerical methods to solve algebraic and transcendental equations and to find Eigen value of a matrix.
C109.4	Estimate the unknown intermediate values through interpolation and calculate the derivatives, the length and area of irregular objects using numerical differentiation and integration.
C109.5	Determine numerical solutions of ordinary differential equations.

  
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## PH3201- Physics For Civil Engineering - [C110]

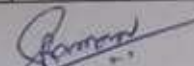
C110.1	Acquire knowledge about heat transfer through different materials, thermal performance of building and thermal insulation.
C110.2	Gain knowledge on the ventilation and air conditioning of buildings
C110.3	Understand the concepts of sound absorption, noise insulation and lighting designs
C110.4	Know about the processing and applications of composites, metallic glasses, shape memory alloys and ceramics
C110.5	Get an awareness on natural disasters such as earth quake, cyclone, fire and safety measures

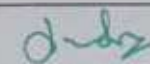
## BE3252 – Basic Electrical, Electronics and Instrumentation Engineering– [C111]

C111.1	Able to understand the basic electric circuit laws and Compute the electric circuit parameters for simple problems using Nodal and Mesh methods.
C111.2	Able to understand the concepts of domestics wiring and protective devices.
C111.3	Able to understand the working principle, characteristics and applications of a.c and d.c electrical machines
C111.4	Able to analyse the characteristics of diodes, Transistors, MOSFET, IGBT and SCR.
C111.5	Able to understand the types and operating principles of different sensors and variable transducers.

## GE3251- Engineering Graphics– [C112]

C112.1	Understand BIS conventions and appropriately demonstrated and also construct the profile of Engineering Conic Curves
C112.2	Identify, explain and represent the orthographic views of projection of Points in all four quadrants, and Projection of lines and Planes in two dimensional plane.
C112.3	Draw the concept of orthographic views from pictorial views, models, and projection of Solids
C112.4	Draw the sectional views of solids, to identify the true shape of cut surfaces and also to develop the surfaces of cut solids
C112.5	Draw the nature of cut surfaces in isometric vews & projections, and also to visualize the perspective projection of simple solids.

  
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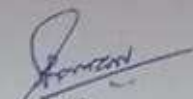
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## GE3271- Engineering Practices Laboratory - [C113]

C113.1	Ability to draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; can able to do Sawing; planing; making joints in wood materials used in common household wood work.
C113.2	Ability to do house wiring and can measure energy.
C113.3	Ability to do arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipment and can do making a tray out of metal sheet using sheet metal work.
C113.4	Ability to do soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB

## GE3272- Basic Electrical, Electronics and Instrumentation Engineering Lab –[C114]

C114.1	Able to understand and do experimental methods to verify the Ohm's law and Kirchoff's Law and to measure three phase power.
C114.2	Able to Analyze experimentally the load characteristics of A.C and D.C electrical machines.
C114.3	Able to Analyze the characteristics of basic electronic devices such as Diode, Transistors, MOSFET and SCR.
C114.4	Able to understand the use of LVDT to measure displacement.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
BE (COMPUTER SCIENCE ENGINEERING)

Year / Semester: I Yr / I Sem

NBA Course Code :C101

Course Name: Professional English - I (HS3151)

### Course Outcomes

C101.1	To listen and comprehend complex academic texts.
C101.2	To read and infer the denotative and connotative meanings of technical texts.
C101.3	To write definitions, descriptions, narrations and essays on various topics.
C101.4	To speak fluently and accurately in formal and informal communicative contexts
C101.5	To express their opinions effectively in both oral and written medium of communication.

Year: I Yr / I Sem

NBA Course Code :C102

Course Name: MATRICES AND CALCULUS (MA3151)

### Course Outcomes

C102.1	To find eigenvalues and eigen vectors of a matrix ,diagonalize symmetric matrix.
C102.2	Acquire the knowledge of Limit definition and differentiation rules to differentiate the functions.
C102.3	Examine the concepts of functions of several variables and to find extremum value of a given function.
C102.4	Evaluate the integrals by using Riemann sum and Fundamental theorem of Calculus.
C102.5	Develop an ability to trace the curve and find area , volume using multiple integrals.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
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Year: I Yr /I Sem

NBA Course Code :C103

Course Name: Engineering Physics (PH3151)

Course Outcomes

C103.1	Effectively understand the importance of Mechanics.
C103.2	Gain knowledge of electromagnetic waves and its applications.
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
C103.4	Understand the importance of quantum physics.
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.


Year: I Yr /I Sem

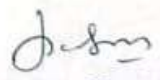
NBA Course Code :C104

Course Name: Engineering Chemistry (CY3151)

Course Outcomes

C104.1	Water treatment techniques will facilitate better understanding of engineering processes and applications for further learning
C104.2	The students will gain knowledge on the basics of properties of nano materials and its applications
C104.3	The students will acquire knowledge on the concepts of composites and phase rule and their applications in compound formation,
C104.4	The knowledge gained on engineering materials, fuels, energy sources will facilitate future learning
C104.5	The students will have adequate knowledge on the concepts of nuclear energy, batteries and their application in energy production

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
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Year: I Yr /I Sem

NBA Course Code :C105

Course Name: Problem Solving And Python Programming (GE3151)

### Course Outcomes

C105.1	Develop algorithmic Designs to simple computational problems.
C105.2	Develop simple statements of python programs for mathematical Expressions.
C105.3	Implement control flow and function concepts for developing Python programs.
C105.4	Understanding Python data structures - lists, tuples & dictionaries for handling compound data.
C105.5	Handling files, exception, modules and packages in Python for solving problems.


Year: I Yr /I Sem

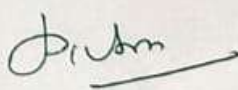
NBA Course Code :C106

Course Name: Problem Solving And Python Programming Laboratory( GE3171)

### Course Outcomes

C106.1	Develop algorithmic solutions to execute simple computational Python programs.
C106.2	Implement programs in Python using conditionals and loops for solving problems real time scenarios.
C106.3	Deploy functions to decompose a Python program in real time mathematical applications.
C106.4	Process compound data using Python data structures by Utilize Python packages in developing software applications.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
BE (COMPUTER SCIENCE ENGINEERING)

Year: I Yr /I Sem

NBA Course Code :C107

Course Name: Physics and Chemistry Laboratory (BS3171)

### Course Outcomes

C107.1	The hands on exercises undergone by the students will help them to apply physics principles of optics Out filled with hands on knowledge about pH and conductometric titration
C107.2	Acquire knowledge about the modulus of elasticity and able to apply them in the field The basic concepts on argentometric titration helps in flouride estimation.
C107.3	Assess the behaviour of columns, beams and failures of materials The basic idea on Potentiometric titration will help the adequate knowledge EMF measurement.

Year: I Yr /II Sem

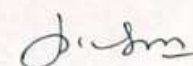
NBA Course Code :C108

Course Name: Professional English - II (HS3251)

### Course Outcomes

C108.1	Compare and Contrast the product and ideas and how to apply in their academic, professional and personal life
C108.2	Identify cause and effects in events, industrial processes as well competency in reporting the events, documentaries, biographies, travelogue, news and technical blogs in oral and written communication.
C108.3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the writer format and diction for accurate description of a process or product through all four skills(LSRW).
C108.4	Report events and the processes of technical and industrial nature and identify the core ideas of various topics in TED talks, scientific lectures, newspaper articles, journals and educational videos and give formal and informal presentations on the same
C108.5	Express and present their opinions, views and ideas diligently in debates, discussions and role plays, and draft clear & concise recommendations and newspaper articles in a logical manner.

  
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Year: I Yr /II Sem

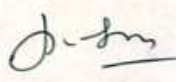
NBA Course Code :C109

Course Name: Statistics and Numerical Methods (MA3251)

Course Outcomes

C109.1	Analyse the statistical data and apply various small and large sample test for testing the hypothesis.
C109.2	Adapt Design of Experiments using analysis of variance to test the hypothesis.
C109.3	Use numerical methods to solve algebraic and transcendental equations and to find Eigen value of a matrix.
C109.4	Estimate the unknown intermediate values through interpolation and calculate the derivatives, the length and area of irregular objects using numerical differentiation and integration.
C109.5	Determine numerical solutions of ordinary differential equations.

  
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Year: I Yr /II Sem

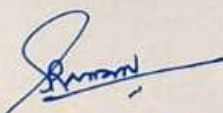
NBA Course Code :C110

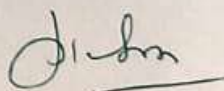
Course Name: Physics for Information Science

(PH3201)Course Outcomes

## Course Outcomes

C110.1	Gain knowledge on classical and quantum electron theories, and energy band structures.
C110.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices.
C110.3	Get knowledge on magnetic properties of materials and their applications in data storage.
C110.4	Have the necessary understanding on the functioning of optical materials for optoelectronics.
C110.5	Understand the basics of quantum structures and their applications and basics of quantum computing

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
BE (COMPUTER SCIENCE ENGINEERING)

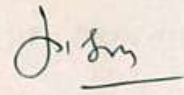
Year: I Yr /II Sem

NBA Course Code :C111

Course Name: Basic Electrical, Electronics Engineering (BE3252) Course Outcomes

C111.1	Explain the basic concepts passive components, simple analysis of laws, theorems, and parameters in electrical circuits.
C111.2	Explain the construction, operation and applications of DC motors, transformers, AC rotating machines
C111.3	Explain the basic concepts passive components in electronic circuits and working principles, characteristics and applications of PN Diode, Zener Diode, BJT, FET, MOSFETS, IGBT, RECTIFIERS.
C111.4	Explain the basic concepts of number systems and codes in digital systems, operations of logic gates, combinational circuits, K-map and simplifications using K-maps..
C111.5	Explain the functional elements of an instruments, standards, calibration, operating principle of MC and MI meters and measurement of power and energy meters and DSO.

  
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# MEENAKSHI SUNDARARAJAN ENGINEERING COLLEGE



363, Arcot Road, Kodambakkam, Chennai – 24  
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Website : [www.msec.edu.in](http://www.msec.edu.in)  
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BE (COMPUTER SCIENCE ENGINEERING)

Year: I Yr /II Sem

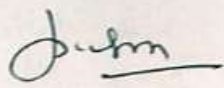
NBA Course Code :C112

Course Name: Engineering Graphics

(GE3251)Course Outcomes

C112.1	Understand BIS conventions and appropriately demonstrated and also construct the profile of Engineering Conic Curves
C112.2	Identify, explain and represent the orthographic views of projection of Points in all four quadrants, and Projection of lines and Planes in two dimensional plane.
C112.3	Draw the concept of orthographic views from pictorial views, models, and projection of Solids
C112.4	Draw the sectional views of solids, to identify the true shape of cut surfaces and also to develop the surfaces of cut solids
C112.5	Draw the nature of cut surfaces in isometric views & projections, and also to visualize the perspective projection of simple solids.

  
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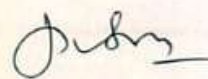
Year: I Yr /II Sem

NBA Course Code :C113

Course Name: **Programming in C (CS 3271)**

C113.1	Demonstrate knowledge on C Programming constructs
C113.2	Develop simple applications in C using basic constructs
C113.3	Design and implement applications using arrays and strings
C113.4	Develop and implement modular applications in C using functions.
C113.5	Develop applications in C using structures and pointers.
C113.6	Design applications using sequential and random access file processing.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
BE (COMPUTER SCIENCE ENGINEERING)


Year: I Yr /II Sem


NBA Course Code :C114

Course Name: Engineering Practices Laboratory(GE3271)

## Course Outcomes

C114.1	Ability to draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; can able to do Sawing; planning; making joints in wood materials used in common household wood work.
C114.2	Ability to do house wiring and can measure energy.
C114.3	Ability to do arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipment and can do Making a tray out of metal sheet using sheet metal work.
C114.4	Ability to do soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
BE (COMPUTER SCIENCE ENGINEERING)

NBA Course Code: C115

Year / Semester: I Yr. /II SEM

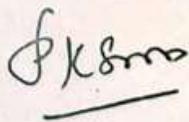
Course Name: Programming in C Laboratory

Course Outcomes

At the end of the course, the student will be able to

C115.1	Simple applications in C using basic constructs
C115.2	Have a strategy to design and implement applications using arrays and strings
C115.3	Understand and implement applications in C using functions and pointers
C115.4	Knowing Applications in C using structures.
C115.5	Design applications using sequential and random access file processing.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
BE (ELECTRONICS AND COMMUNICATION ENGINEERING)

REGULATION – 2021

## HS3151 - Professional English-I [C101]

C101.1	To listen and comprehend complex academic texts.
C101.2	To read and infer the denotative and connotative meanings of technical texts.
C101.3	To write definitions, descriptions, narrations and essays on various topics.
C101.4	To speak fluently and accurately in formal and informal communicative contexts.
C101.5	To express their opinions effectively in both oral and written medium of communication.

## MA3151 – Matrices and Calculus [C102]

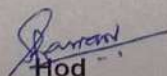
C102.1	To find eigenvalues and eigen vectors of a matrix, diagonalize symmetric matrix.
C102.2	Acquire the knowledge of Limit definition and differentiation rules to differentiate the functions.
C102.3	Examine the concepts of functions of several variables and to find extremum value of a given function.
C102.4	Evaluate the integrals by using Riemann sum and Fundamental theorem of Calculus.
C102.5	Develop an ability to trace the curve and find area, volume using multiple integrals.

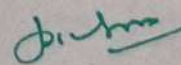
## PH3151 - Engineering Physics [C103]

C103.1	Effectively understand the importance of Mechanics.
C103.2	Gain knowledge of electromagnetic waves and its applications.
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
C103.4	Understand the importance of quantum physics.
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.

## CY3151 - Engineering Chemistry [C104]

C104.1	Water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
C104.2	The students will gain knowledge on the basics of properties of nano materials and its applications.
C104.3	The students will acquire knowledge on the concepts of composites and phase rule and their applications in compound formation.
C104.4	The knowledge gained on engineering materials, fuels, energy sources will facilitate future learning.
C104.5	The students will have adequate knowledge on the concepts of nuclear energy, batteries and their application in energy production.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
BE (ELECTRONICS AND COMMUNICATION ENGINEERING)

## GE3151 -Problem Solving And Python Programming [C105]

C105.1	Develop algorithmic Designs to simple computational problems.
C105.2	Develop simple statements of python programs for mathematical Expressions.
C105.3	Implement control flow and function concepts for developing Python programs.
C105.4	Understanding Python data structures - lists, tuples & dictionaries for handling compound data.
C105.5	Handling files, exception, modules and packages in Python for solving problems.

## GE3171 -Problem Solving And Python Programming Laboratory [C106]

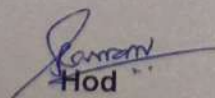
C106.1	Develop algorithmic solutions to execute simple computational Python programs.
C106.2	Implement programs in Python using conditionals and loops for solving problems real time scenarios.
C106.3	Deploy functions to decompose a Python program in real time mathematical applications.
C106.4	Process compound data using Python data structures by Utilize Python packages in developing software applications.

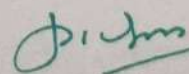
## BS3171 – Physics And Chemistry Laboratory [C107]

C107.1	The hands on exercises undergone by the students will help them to apply physics principles of optics. Out filled with hands on knowledge about pH and conductometric titration.
C107.2	Acquire knowledge about the modulus of elasticity and able to apply them in the field. The basic concepts on argentometric titration helps in flouride estimation.
C107.3	Assess the behaviour of columns, beams and failures of materials. The basic idea on Potentiometric titration will help the adequate knowledge EMF measurement.

## HS3251 – Professional English-II [C108]

C108.1	Compare and Contrast the product and ideas and how to apply in their academic, professional and personal life.
C108.2	Identify cause and effects in events, industrial processes as well competency in reporting the events, documentaries, biographies, travelogue, news and technical blogs in oral and written communication.
C108.3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format and diction for accurate description of a process or product through all four skills(LSRW).
C108.4	Report events and the processes of technical and industrial nature and identify the core ideas of various topics in TED talks, scientific lectures, newspaper articles, journals and educational videos and give formal and informal presentations on the same
C108.5	Express and present their opinions, views and ideas diligently in debates, discussions and role plays, and draft clear & concise recommendations and newspaper articles in a logical manner.

  
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## DEPARTMENT OF HUMANITIES AND SCIENCE BE (ELECTRONICS AND COMMUNICATION ENGINEERING) MA3251 – Statistics and Numerical Methods [C109]

C109.1	Analyse the statistical data and apply various small and large sample test for testing the hypothesis.
C109.2	Adapt Design of Experiments using analysis of variance to test the hypothesis.
C109.3	Use numerical methods to solve algebraic and transcendental equations and to find eigen value of a matrix.
C109.4	Estimate the unknown intermediate values through interpolation and calculate the derivatives, the length and area of irregular objects using numerical differentiation and integration.
C109.5	Determine numerical solutions of ordinary differential equations.

## PH3254– Physics for Electronics Engineering [C110]

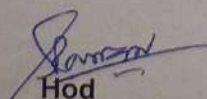
C110.1	Express the knowledge of crystallography and its importance for varied materials properties.
C110.2	Gains knowledge on the electrical and magnetic properties of materials and their applications.
C110.3	Understands clearly of semiconductor physics and functioning of semiconductor devices.
C110.4	Acquire knowledge about the optical properties of materials and working principles of various optical devices.
C110.5	Appreciate the basics and importance of nanotechnology and Nano devices.

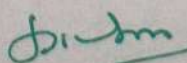
## BE3254 - Electrical and Instrumentation Engineering [C111]

C111.1	Explain the working principle and operation of electrical transformer.
C111.2	Explain the construction and operation of DC machine, universal motor, stepper motor and BLDC motor.
C111.3	Explain the construction and operation of AC rotating machines.
C111.4	Explain the types and operating principles of measuring instruments
C111.5	Explain the basic power system structure, protection schemes and the safety precautions to be followed.

## GE3251 – Engineering Graphics [C112]

C112.1	Understand BIS conventions and appropriately demonstrated and also construct the profile of Engineering Conic Curves
C112.2	Identify, explain and represent the orthographic views of projection of Points in all four quadrants, and Projection of lines and Planes in two dimensional plane.
C112.3	Draw the concept of orthographic views from pictorial views, models, and projection of Solids
C112.4	Draw the sectional views of solids, to identify the true shape of cut surfaces and also to develop the surfaces of cut solids
C112.5	Draw the nature of cut surfaces in isometric views & projections, and also to visualize the perspective projection of simple solids.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
BE (ELECTRONICS AND COMMUNICATION ENGINEERING)  
EC3251 –Circuit Analysis[C113]

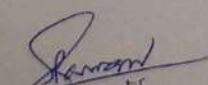
C113.1	Apply the basic concepts of circuit analysis such as Kirchoff's laws, mesh current and node Voltage method for analysis of DC and AC circuits.
C113.1	Apply suitable network theorems and analyze AC and DC circuits.
C113.1	Analyze steady state response of any R, L and C circuits.
C113.1	Analyze the transient response for any RC, RL and RLC circuits and frequency response of parallel and series resonance circuits.
C113.1	Analyze the coupled circuits and network topologies.

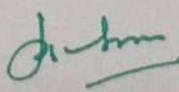
## GE3271 – Engineering Practices Laboratory [C114]

C114.1	Ability to draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; can able to do Sawing; planning; making joints in wood materials used in common household wood work.
C114.2	Ability to do house wiring and can measure energy.
C114.3	Ability to do arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipment and can do Making a tray out of metal sheet using sheet metal work.
C114.4	Ability to do soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.

## EC3271 – Circuits Analysis Laboratory [C115]

C115.1	Design RL and RC circuits.
C115.2	Verify Thevinin & Norton theorem KVL & KCL, and Super Position Theorems.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE

BE (ELECTICAL AND ELECTRONICS ENGINEERING)

REGULATION – 2021

COURSE OUTCOMES

(CO)

**HS3151-Professional English-I [C101]**

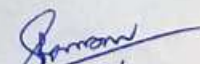
C101.1	To listen and comprehend complex academic texts.
C101.2	To read and infer the denotative and connotative meanings of technical texts.
C101.3	To write definitions, descriptions, narrations and essays on various topics.
C101.4	To speak fluently and accurately in formal and informal communicative contexts
C101.5	To express their opinions effectively in both oral and written medium of communication.

**MA3151-Matrices and Calculus [C102]**

C102.1	To find eigenvalues and eigen vectors of a matrix ,diagonalize symmetric matrix:
C102.2	Acquire the knowledge of Limit definition and differentiation rules to differentiate the functions.
C102.3	Examine the concepts of functions of several variables and to find extremumvalue of a given function.
C102.4	Evaluate the integrals by using Riemann sum and Fundamental theorem of Calculus.
C102.5	Develop an ability to trace the curve and find area , volume using multiple integrals.

**PH3151-Engineering Physics [C103]**

C103.1	Effectively understand the importance of Mechanics.
C103.2	Gain knowledge of electromagnetic waves and its applications.
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
C103.4	Understand the importance of quantum physics.
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE

BE (ELECTICAL AND ELECTRONICS ENGINEERING)

**CY3151 -Engineering Chemistry [C104]**

C104.1	Water treatment techniques will facilitate better understanding of engineering processes and applications for further learning
C104.2	The students will gain knowledge on the basics of properties of nano materials and its applications
C104.3	The students will acquire knowledge on the concepts of composites and phase rule and their applications in compound formation,
C104.4	The knowledge gained on engineering materials, fuels, energy sources will facilitate future learning
C104.5	The students will have adequate knowledge on the concepts of nuclear energy, batteries and their application in energy production

**GE3151- Problem Solving And Python Programming [C105]**

C105.1	Develop algorithmic Designs to simple computational problems.
C105.2	Develop simple statements of python programs for mathematical Expressions.
C105.3	Implement control flow and function concepts for developing Python programs.
C105.4	Understanding Python data structures - lists, tuples & dictionaries for handling compound data.
C105.5	Handling files, exception, modules and packages in Python for solving problems.

**GE3171 – Problem Solving And Python Programming Laboratory – [C106]**

C106.1	Develop algorithmic solutions to execute simple computational Python programs.
C106.2	Implement programs in Python using conditionals and loops for solving problems real time scenarios.
C106.3	Deploy functions to decompose a Python program in real time mathematical applications.
C106.4	Process compound data using Python data structures by Utilize Python packages in developing software applications.

  
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**BS3171– Physics And Chemistry Laboratory – [C107]**

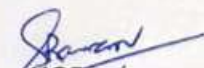
C107.1	The hands on exercises undergone by the students will help them to apply physics principles of optics Out filled with hands on knowledge about pH and conductometric titration
C107.2	Acquire knowledge about the modulus of elasticity and able to apply them in the field. The basic concepts on argentometric titration helps in flouride estimation.
C107.3	Assess the behaviour of columns, beams and failures of materials. The basic idea on Potentiometric titration will help the adequate knowledge EMF measurement.

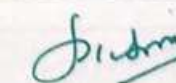
**HS3251 - Professional English - II [C108]**

C108.1	Compare and Contrast the product and ideas and how to apply in their academic, professional and personal life.
C108.2	Identify cause and effects in events, industrial processes as well competency in reporting the events, documentaries, biographies, travelogue, news and technical blogs in oral and written communication.
C108.3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format and diction for accurate description of a process or product through all four skills(LSRW).
C108.4	Report events and the processes of technical and industrial nature and identify the core ideas of various topics in TED talks, scientific lectures, newspaper articles, journals and educational videos and give formal and informal presentations on the same
C108.5	Express and present their opinions, views and ideas diligently in debates, discussions and role plays, and draft clear & concise recommendations and newspaper articles in a logical manner.

**MA3251 - Statistics and Numerical Methods [C109]**

C109.1	Analyse the statistical data and apply various small and large sample test for testing the hypothesis.
C109.2	Adapt Design of Experiments using analysis of variance to test the hypothesis.
C109.3	Use numerical methods to solve algebraic and transcendental equations and to find Eigen value of amatrix.
C109.4	Estimate the unknown intermediate values through interpolation and calculate the derivatives, the length and area of irregular objects using numerical differentiation and integration.
C109.5	Determine numerical solutions of ordinary differential equations.

  
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**PH3202- Physics for Electrical Engineering - [C110]**

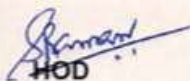
C110.1	Express the knowledge of dielectric materials and insulation.
C110.2	Gains knowledge on the electrical and magnetic properties of materials and their applications.
C110.3	Understands clearly of semiconductor physics and functioning of semiconductor devices.
C110.4	Acquire knowledge about the optical properties of materials and working principles of various optical devices.
C110.5	Appreciate the basics and importance of nanotechnology and Nano devices.

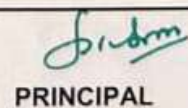
**BE3255 – Basic Civil and Mechanical Engineering – [C111]**

C111.1	Understand the significance of civil and mechanical engineering profession to the benefit of society
C111.2	Familiarize with the principles of measurements, different materials used for construction
C111.3	Understand the various components of building, solid waste management, rain water harvesting, green buildings
C111.4	Identify the components of IC engines, power plants and demonstrate their working principle
C111.5	Elaborate the components and working of refrigeration and air conditioning systems.

**GE3251- Engineering Graphics– [C112]**

C112.1	Understand BIS conventions and appropriately demonstrated and also construct the profile of Engineering Conic Curves
C112.2	Identify, explain and represent the orthographic views of projection of Points in all four quadrants, and Projection of lines and Planes in two dimensional plane.
C112.3	Draw the concept of orthographic views from pictorial views, models, and projection of Solids
C112.4	Draw the sectional views of solids, to identify the true shape of cut surfaces and also to develop the surfaces of cut solids
C112.5	Draw the nature of cut surfaces in isometric views & projections, and also to visualize the perspective projection of simple solids.

  
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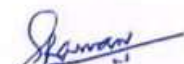
BE (ELECTICAL AND ELECTRONICS ENGINEERING)

EE3251- Electric circuit analysis – [C113]

C113.1	Able to understand fundamental laws and analyse electrical circuits with different techniques
C113.2	Able to gain conceptual knowledge in solving circuits by applying network reduction techniques and network theorems
C113.3	Able to Compute the transient response of first order and second order systems to step and sinusoidal input
C113.4	Able to interpret the concept of resonance and coupled circuits
C113.5	Able to develop understanding of three phase circuits under balanced and unbalanced condition

GE3271- Engineering Practices Laboratory - [C114]

C114.1	Ability to draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; can able to do Sawing; planning; making joints in wood materials used in common household wood work.
C114.2	Ability to do house wiring and can measure energy.
C114.3	Ability to do arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipment and can do making a tray out of metal sheet using sheet metal work.
C114.4	Ability to do soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB

  
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MEENAKSHI SUNDARARAJAN ENGINEERING COLLEGE

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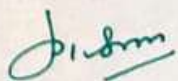
DEPARTMENT OF HUMANITIES AND SCIENCE

BE (ELECTICAL AND ELECTRONICS ENGINEERING)

EE3271 Electrical Circuit lab –[C115]

C115.1	Use simulation and experimental methods to verify the fundamental electrical laws for the given DC/AC circuit
C115.2	Use simulation and experimental methods to verify the various electrical theorems (Superposition, Thevenin , Norton and maximum power transfer) for the given DC/AC circuit
C115.3	Analyze transient behavior of the given RL/RC/RLC circuit using simulation and experimental methods
C115.4	Analyze frequency response of the given series and parallel RLC circuit using simulation and experimentation methods
C115.5	Analyze the performance of the given three-phase circuit using simulation and experimental methods

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
BE (MECHANICAL ENGINEERING)  
REGULATION – 2021

## HS3151- Professional English - I [C101]

C101.1	To listen and comprehend complex academic texts.
C101.2	To read and infer the denotative and connotative meanings of technical texts.
C101.3	To write definitions, descriptions, narrations and essays on various topics.
C101.4	To speak fluently and accurately in formal and informal communicative contexts
C101.5	To express their opinions effectively in both oral and written medium of communication.

## MA3151- Matrices and Calculus [C102]


C102.1	To find eigenvalues and eigen vectors of a matrix ,diagonalize symmetric matrix.
C102.2	Acquire the knowledge of Limit definition and differentiation rules to differentiate the functions.
C102.3	Examine the concepts of functions of several variables and to find extremum value of a given function.
C102.4	Evaluate the integrals by using Riemann sum and Fundamental theorem of Calculus.
C102.5	Develop an ability to trace the curve and find area ,volume using multiple integrals.

## PH3151- Engineering Physics [C103]

C103.1	Effectively understand the importance of Mechanics.
C103.2	Gain knowledge of electromagnetic waves and its applications.
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
C103.4	Understand the importance of quantum physics.
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.

## CY3151- Engineering Chemistry [C104]

C104.1	Water treatment techniques will facilitate better understanding of engineering processes and applications for further learning
C104.2	The students will gain knowledge on the basics of properties of nano materials and its applications
C104.3	The students will acquire knowledge on the concepts of composites and phase rule and their applications in compound formation,
C104.4	The knowledge gained on engineering materials, fuels, energy sources will facilitate future learning
C104.5	The students will have adequate knowledge on the concepts of nuclear energy, batteries and their application in energy production

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
BE (MECHANICAL ENGINEERING)

### GE3151- Problem Solving & Python Programming [C105]

C105.1	Develop algorithmic Designs to simple computational problems.
C105.2	Develop simple statements of python programs for mathematical Expressions.
C105.3	Implement control flow and function concepts for developing Python programs.
C105.4	Understanding Python data structures - lists, tuples & dictionaries for handling compound data.
C105.5	Handling files, exception, modules and packages in Python for solving problems.

### GE3171- Problem Solving and Python Programming Laboratory [C106]

C106.1	Develop algorithmic solutions to execute simple computational Python programs.
C106.2	Implement programs in Python using conditionals and loops for solving problems real time scenarios.
C106.3	Deploy functions to decompose a Python program in real time mathematical applications.
C106.4	Process compound data using Python data structures by Utilize Python packages in developing software applications.

### BS3171- Physics and Chemistry Laboratory [C107]

C107.1	The hands on exercises undergone by the students will help them to apply physics principles of optics Out filled with hands on knowledge about pH and conductometric titration
C107.2	Acquire knowledge about the modulus of elasticity and able to apply them in the field. The basic concepts on argentometric titration helps in flouride estimation.
C107.3	Assess the behaviour of columns, beams and failures of materials. The basic idea on Potentiometric titration will help the adequate knowledge EMF measurement.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
BE (MECHANICAL ENGINEERING)

### HS3251- Professional English - II [C108]

C108.1	Compare and Contrast the product and ideas and how to apply in their academic, professional and personal life.
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C108.3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format and diction for accurate description of a process or product through all four skills(LSRW).
C108.4	Report events and the processes of technical and industrial nature and identify the core ideas of various topics in TED talks, scientific lectures, newspaper articles, journals and educational videos and give formal and informal presentations on the same
C108.5	Express and present their opinions, views and ideas diligently in debates, discussions and role plays, and draft clear & concise recommendations and newspaper articles in a logical manner.

### MA3251- Statistics and Numerical Methods [C109]

C109.1	Analyse the statistical data and apply various small and large sample test for testing the hypothesis.
C109.2	Adapt Design of Experiments using analysis of variance to test the hypothesis.
C109.3	Use numerical methods to solve algebraic and transcendental equations and to find eigen value of a matrix.
C109.4	Estimate the unknown intermediate values through interpolation and calculate the derivatives, the length and area of irregular objects using numerical differentiation and integration.
C109.5	Determine numerical solutions of ordinary differential equations.

### PH3251-Materials Science [C110]

C110.1	Know basics of crystallography and its importance for varied materials properties.
C110.2	Gain knowledge on the electrical and magnetic properties of materials and their applications
C110.3	Acquire knowledge of semiconductor physics and functioning of semiconductor devices.
C110.4	Understand the optical properties of materials and working principles of various optical devices.
C110.5	Get an insight and appreciate the importance of functional Nano electronic devices.

  
Hod

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
BE (MECHANICAL ENGINEERING)

## BE3251- Basic Electrical and Electronics Engineering [C111]

C111.1	Explain the basic concepts passive components, simple analysis of laws, theorems, and parameters in electrical circuits.
C111.2	Explain the construction, operation and applications of DC motors, transformers, AC rotating machines
C111.3	Explain the basic concepts passive components in electronic circuits and working principles, characteristics and applications of PN Diode, Zener Diode, BJT, FET, MOSFETS, IGBT, RECTIFIERS.
C111.4	Explain the basic concepts of number systems and codes in digital systems, operations of logic gates, combinational circuits, K-map and simplifications using K-maps.
C111.5	Explain the functional elements of an instruments, standards, calibration, operating principle of MC and MI meters and measurement of power and energy meters and DSO.

## GE8152- Engineering Graphics [C112]

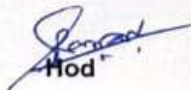
C112.1	Understand BIS conventions and appropriately demonstrated and also construct the profile of Engineering Conic Curves
C112.2	Identify, explain and represent the orthographic views of projection of Points in all four quadrants, and Projection of lines and Planes in two dimensional plane.
C112.3	Draw the concept of orthographic views from pictorial views, models, and projection of Solids
C112.4	Draw the sectional views of solids, to identify the true shape of cut surfaces and also to develop the surfaces of cut solids
C112.5	Draw the nature of cut surfaces in isometric views & projections, and also to visualize the perspective projection of simple solids.

## GE8261-Engineering Practices Laboratory [C113]

C113.1	Ability to draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; can able to do Sawing; planning; making joints in wood materials used in common household wood work.
C113.2	Ability to do house wiring and can measure energy.
C113.3	Ability to do arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipment and can do Making a tray out of metal sheet using sheet metal work.
C113.4	Ability to do soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.

## BE3271 - Basic Electrical and Electronics Engineering Laboratory [C114]

C114.1	Verify kirchoffs current law and voltage law.
C114.2	Perform load test and draw the characteristics of DC rotating machines, transformer and Induction motor.
C114.3	Construct electronic and digital circuits using semiconductor devices and IC's.

  
Head

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
B.TECH- INFORMATION TECHNOLOGY

## REGULATION – 2021 COURSE OUTCOMES (CO)

### HS3151-Professional English - I [C101]

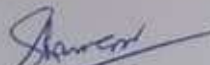
C101.1	To listen and comprehend complex academic texts.
C101.2	To read and infer the denotative and connotative meanings of technical texts.
C101.3	To write definitions, descriptions, narrations and essays on various topics.
C101.4	To speak fluently and accurately in formal and informal communicative contexts
C101.5	To express their opinions effectively in both oral and written medium of communication.

### MA3151-Matrices and Calculus [C102]

C102.1	To find eigenvalues and eigen vectors of a matrix ,diagonalize symmetric matrix.
C102.2	Acquire the knowledge of Limit definition and differentiation rules to differentiate the functions.
C102.3	Examine the concepts of functions of several variables and to find extremum value of a given function.
C102.4	Evaluate the integrals by using Riemann sum and Fundamental theorem of Calculus.
C102.5	Develop an ability to trace the curve and find area , volume using multiple integrals.

### PH3151-Engineering Physics [C103]

C103.1	Effectively understand the importance of Mechanics.
C103.2	Gain knowledge of electromagnetic waves and its applications.
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
C103.4	Understand the importance of quantum physics.
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
B.TECH- INFORMATION TECHNOLOGY

## CY3151 -Engineering Chemistry [C104]

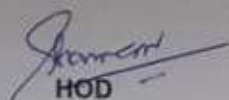
C104.1	Water treatment techniques will facilitate better understanding of engineering processes and applications for further learning
C104.2	The students will gain knowledge on the basics of properties of nano materials and its applications
C104.3	The students will acquire knowledge on the concepts of composites and phase rule and their applications in compound formation,
C104.4	The knowledge gained on engineering materials, fuels, energy sources will facilitate future learning
C104.5	The students will have adequate knowledge on the concepts of nuclear energy, batteries and their application in energy production

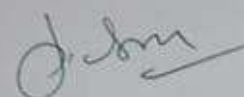
## GE3151- Problem Solving And Python Programming [C105]

C105.1	Develop algorithmic Designs to simple computational problems.
C105.2	Develop simple statements of python programs for mathematical Expressions.
C105.3	Implement control flow and function concepts for developing Python programs.
C105.4	Understanding Python data structures - lists, tuples & dictionaries for handling compound data.
C105.5	Handling files, exception, modules and packages in Python for solving problems.

## GE3171 – Problem Solving And Python Programming Laboratory – [C106]

C106.1	Develop algorithmic solutions to execute simple computational Python programs.
C106.2	Implement programs in Python using conditionals and loops for solving problems real time scenarios.
C106.3	Deploy functions to decompose a Python program in real time mathematical applications.
C106.4	Process compound data using Python data structures by Utilize Python packages in developing software applications.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
B.TECH- INFORMATION TECHNOLOGY

## BS3171– Physics And Chemistry Laboratory – [C107]

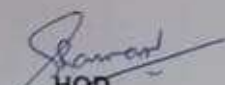
C107.1	The hands on exercises undergone by the students will help them to apply physics principles of optics Out filled with hands on knowledge about pH and conductometric titration
C107.2	Acquire knowledge about the modulus of elasticity and able to apply them in the field. The basic concepts on argentometric titration helps in flouride estimation.
C107.3	Assess the behaviour of columns, beams and failures of materials. The basic idea on Potentiometric titration will help the adequate knowledge EMF measurement.

## HS3251 - Professional English - II [C108]

C108.1	Compare and Contrast the product and ideas and how to apply in their academic, professional and personal life.
C108.2	Identify cause and effects in events, industrial processes as well competency in reporting the events, documentaries, biographies, travelogue, news and technical blogs in oral and written communication.
C108.3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format and diction for accurate description of a process or product through all four skills(LSRW).
C108.4	Report events and the processes of technical and industrial nature and identify the core ideas of various topics in TED talks, scientific lectures, newspaper articles, journals and educational videos and give formal and informal presentations on the same
C108.5	Express and present their opinions, views and ideas diligently in debates, discussions and role plays, and draft clear & concise recommendations and newspaper articles in a logical manner.

## MA3251 - Statistics and Numerical Methods [C109]

C109.1	Analyse the statistical data and apply various small and large sample test for testing the hypothesis.
C109.2	Adapt Design of Experiments using analysis of variance to test the hypothesis.
C109.3	Use numerical methods to solve algebraic and transcendental equations and to find Eigen value of a matrix.
C109.4	Estimate the unknown intermediate values through interpolation and calculate the derivatives, the length and area of irregular objects using numerical differentiation and integration.
C109.5	Determine numerical solutions of ordinary differential equations.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
B.TECH- INFORMATION TECHNOLOGY

## PH3256- Physics for Information Science - [C110]


C110.1	Gain knowledge on classical and quantum electron theories, and energy band structures.
C110.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices.
C110.3	Get knowledge on magnetic properties of materials and their applications in data storage.
C110.4	Have the necessary understanding on the functioning of optical materials for optoelectronics.
C110.5	Understand the basics of quantum structures and their applications and basics of quantum computing

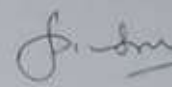
## BE3251-Basic Electrical and Electronics Engineering -[C111]

C111.1	Able to understand the basic electric circuit laws and Compute the electric circuit parameters for simple problems using Nodal and Mesh methods.
C111.2	Able to understand the concepts of domestics wiring and protective devices.
C111.3	Able to understand the working principle, characteristics and applications of a.c and d.c electrical machines
C111.4	Able to analyse the characteristics of diodes, Transistors, MOSFET, IGBT and SCR.
C111.5	Able to understand the types and operating principles of different sensors and variable transducers.

## GE3251- Engineering Graphics– [C112]

C112.1	Understand BIS conventions and appropriately demonstrated and also construct the profile of Engineering Conic Curves
C112.2	Identify, explain and represent the orthographic views of projection of Points in all four quadrants, and Projection of lines and Planes in two dimensional plane.
C112.3	Draw the concept of orthographic views from pictorial views, models, and projection of Solids
C112.4	Draw the sectional views of solids, to identify the true shape of cut surfaces and also to develop the surfaces of cut solids
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DEPARTMENT OF HUMANITIES AND SCIENCE  
B.TECH- INFORMATION TECHNOLOGY

## CS3251- Programming in C - [C113]

C113.1	Demonstrate knowledge on C Programming constructs.
C113.2	Develop simple applications in C using basic constructs.
C113.3	Design and implement applications using arrays and strings.
C113.4	Develop and implement modular applications in C using functions
C113.5	Develop application in C using structures and pointers


## GE3271-Engineering Practices Laboratory-[C114]

C114.1	Ability to draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; can able to do Sawing; planning; making joints in wood materials used in common household wood work.
C114.2	Ability to do house wiring and can measure energy.
C114.3	Ability to do arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipment and can do Making a tray out of metal sheet using sheet metal work.
C114.4	Ability to do soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.

## CS3251-Programming in C Laboratory-[C115]

C115.1	Simple applications in c using basic constructs
C115.2	Have a strategy to design and implement applications using arrays and strings
C115.3	Understand and implement applications in C using functions and pointers.
C115.4	Knowing Applications in C using structures.
C115.5	Design applications using sequential and random access file processing.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
B.TECH- ARTIFICIAL INTELLIGENCE AND DATA STRUCTURES

## REGULATION – 2021 COURSE OUTCOMES (CO)

### HS3151-Professional English - I [C101]

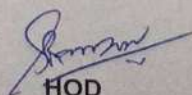
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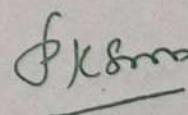
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DEPARTMENT OF HUMANITIES AND SCIENCE  
B.TECH- ARTIFICIAL INTELLIGENCE AND DATA STRUCTURES

## CY3151 -Engineering Chemistry [C104]

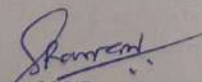
C104.1	Water treatment techniques will facilitate better understanding of engineering processes and applications for further learning
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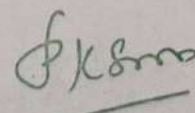
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C105.5	Handling files, exception, modules and packages in Python for solving problems.

## GE3171 – Problem Solving And Python Programming Laboratory – [C106]

C106.1	Develop algorithmic solutions to execute simple computational Python programs.
C106.2	Implement programs in Python using conditionals and loops for solving problems real time scenarios.
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DEPARTMENT OF HUMANITIES AND SCIENCE  
B.TECH- ARTIFICIAL INTELLIGENCE AND DATA STRUCTURES

## BS3171– Physics And Chemistry Laboratory – [C107]

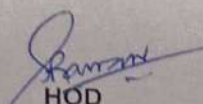
C107.1	The hands on exercises undergone by the students will help them to apply physics principles of optics Out filled with hands on knowledge about pH and conductometric titration
C107.2	Acquire knowledge about the modulus of elasticity and able to apply them in the field. The basic concepts on argentometric titration helps in flouride estimation.
C107.3	Assess the behaviour of columns, beams and failures of materials. The basic idea on Potentiometric titration will help the adequate knowledge EMF measurement.

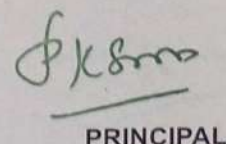
## HS3251 - Professional English - II [C108]

C108.1	Compare and Contrast the product and ideas and how to apply in their academic, professional and personal life.
C108.2	Identify cause and effects in events, industrial processes as well competency in reporting the events, documentaries, biographies, travelogue, news and technical blogs in oral and written communication.
C108.3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format and diction for accurate description of a process or product through all four skills(LSRW).
C108.4	Report events and the processes of technical and industrial nature and identify the core ideas of various topics in TED talks, scientific lectures, newspaper articles, journals and educational videos and give formal and informal presentations on the same
C108.5	Express and present their opinions, views and ideas diligently in debates, discussions and role plays, and draft clear & concise recommendations and newspaper articles in a logical manner.

## MA3251 - Statistics and Numerical Methods [C109]

C109.1	Analyse the statistical data and apply various small and large sample test for testing the hypothesis.
C109.2	Adapt Design of Experiments using analysis of variance to test the hypothesis.
C109.3	Use numerical methods to solve algebraic and transcendental equations and to find Eigen value of a matrix.
C109.4	Estimate the unknown intermediate values through interpolation and calculate the derivatives, the length and area of irregular objects using numerical differentiation and integration.
C109.5	Determine numerical solutions of ordinary differential equations.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
B.TECH- ARTIFICIAL INTELLIGENCE AND DATA STRUCTURES

## PH3256- Physics for Information Science - [C110]

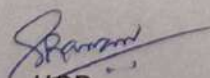
C110.1	Gain knowledge on classical and quantum electron theories, and energy band structures.
C110.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices.
C110.3	Get knowledge on magnetic properties of materials and their applications in data storage.
C110.4	Have the necessary understanding on the functioning of optical materials for optoelectronics.
C110.5	Understand the basics of quantum structures and their applications and basics of quantum computing

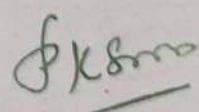
## BE3251-Basic Electrical and Electronics Engineering -[C111]

C111.1	Able to understand the basic electric circuit laws and Compute the electric circuit parameters for simple problems using Nodal and Mesh methods.
C111.2	Able to understand the concepts of domestics wiring and protective devices.
C111.3	Able to understand the working principle, characteristics and applications of a.c and d.c electrical machines
C111.4	Able to analyse the characteristics of diodes, Transistors, MOSFET, IGBT and SCR.
C111.5	Able to understand the types and operating principles of different sensors and variable transducers.

## GE3251- Engineering Graphics– [C112]

C112.1	Understand BIS conventions and appropriately demonstrated and also construct the profile of Engineering Conic Curves
C112.2	Identify, explain and represent the orthographic views of projection of Points in all four quadrants, and Projection of lines and Planes in two dimensional plane.
C112.3	Draw the concept of orthographic views from pictorial views, models, and projection of Solids
C112.4	Draw the sectional views of solids, to identify the true shape of cut surfaces and also to develop the surfaces of cut solids
C112.5	Draw the nature of cut surfaces in isometric vews & projections, and also to visualize the perspective projection of simple solids.

  
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## DEPARTMENT OF HUMANITIES AND SCIENCE B.TECH- ARTIFICIAL INTELLIGENCE AND DATA STRUCTURES

### AD3251- Data Structures Design - [C113]

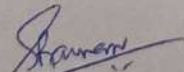
C114.1	Explain abstract data types and Algorithmic Notations.
C114.2	Design, Implement, and Analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications.
C114.3	Understanding and Analysing the algorithms of searching and sorting.
C114.4	Design, Implement, and Analyse efficient tree structures to meet requirements such as searching, indexing, and sorting.
C114.5	Model problems as graph problems and implement efficient graph algorithms to access data's.

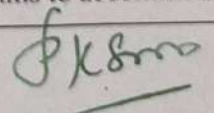
### GE3271-Engineering Practices Laboratory-[C114]

C114.1	Ability to draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; can able to do Sawing; planning; making joints in wood materials used in common household wood work.
C114.2	Ability to do house wiring and can measure energy.
C114.3	Ability to do arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipment and can do Making a tray out of metal sheet using sheet metal work.
C114.4	Ability to do soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.

### AD3271-Data Structures Design Laboratory-[C115]

C116.1	Design and Implement ADTs as Python classes
C116.2	Design, Implement, and Analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications.
C116.3	Design, Implement, and Analyse efficient tree structures to meet requirements such as searching, indexing, and sorting
C116.4	Model problems as graph problems and implement efficient graph algorithms to accommodate data

  
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DEPARTMENT OF CIVIL ENGINEERING

REGULATION – 2021

## COURSE OUTCOMES (CO)

### MA3351 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS (C201)

C201.1	Understand how to solve the given standard partial differential equations
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications
C201.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations
C201.4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

### ME3351 ENGINEERING MECHANICS (C202)

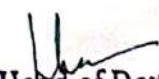
C202.1	Illustrate the vectorial and scalar representation of forces and moments
C202.2	Analyse the rigid body in equilibrium
C202.3	Evaluate the properties of distributed forces
C202.4	Determine the friction and the effects by the laws of friction
C202.5	Calculate dynamic forces exerted in rigid body

### CE3301 FLUID MECHANICS (C203)

C203.1	Demonstrate the difference between solid and fluid, its properties and behaviour in static conditions
C203.2	Apply the conservation laws applicable to fluids and its application through fluid kinematics and dynamics
C203.3	Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies.
C203.4	Estimate the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel.
C203.5	Explain the concept of boundary layer and its application to find the drag force exerted by the fluid on the flat solid surface.

  
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Head of Department  
Department of Civil Engineering



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DEPARTMENT OF CIVIL ENGINEERING

## CE3302 CONSTRUCTION MATERIALS AND TECHNOLOGY (C204)

C204.1	Identify the good quality brick, stone and blocks for construction.
C204.2	Recognize the market forms of timber, steel, aluminum and applications of various composite materials.
C204.3	Identify the best construction and service practices such as thermal insulations and air conditioning of the building
C204.4	Select various equipment's for construction works conditioning of building
C204.5	Understand the construction planning and scheduling techniques

## CE3303 WATER SUPPLY AND WASTEWATER ENGINEERING (C205)

C205.1	Understand the various components of water supply scheme and design of intake structure and conveyance system for water transmission
C205.2	Understand on the characteristics and composition of sewage, ability to estimate sewage generation and design sewer system including sewage pumping stations
C205.3	Understand the process of conventional treatment and design of water and wastewater treatment system and gain knowledge of selection of treatment process and biological treatment process
C205.4	Ability to design and evaluate water distribution system and water supply in buildings and understand the self-purification of streams and sludge and septage disposal methods.
C205.5	Able to understand and design the various advanced treatment system and knowledge about the recent advances in water and wastewater treatment process and reuse of sewage

## CE3351 SURVEYING AND LEVELLING (C206)

C206.1	Introduce the rudiments of various surveying and its principles
C206.2	Imparts knowledge in computation of levels of terrain and ground features
C206.3	Imparts concepts of Theodolite Surveying for complex surveying operations
C206.4	Understand the procedure for establishing horizontal and vertical control
C206.5	Imparts the knowledge on modern surveying instruments

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Principal

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DEPARTMENT OF CIVIL ENGINEERING

## CE3361 SURVEYING AND LEVELLING LABORATORY (C207)

C207.1	Impart knowledge on the usage of basic surveying instruments like chain/tape, compass and levelling instruments
C207.2	Able to use levelling instrument for surveying operations
C207.3	Able to use theodolite for various surveying operations
C207.4	Able to carry out necessary surveys for social infrastructures
C207.5	Able to prepare planimetric maps

## CE3311 WATER AND WASTEWATER ANALYSIS LABORATORY (C208)

C208.1	Calibrate and standardize the equipment
C208.2	Collect proper sample for analysis
C208.3	To know the sample preservation methods
C208.4	To perform field oriented testing of water, wastewater
C208.5	To perform coliform analysis

## GE3361 PROFESSIONAL DEVELOPMENT (C209)

C209.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
C209.2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
C209.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects

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DEPARTMENT OF CIVIL ENGINEERING

## CE3401 APPLIED HYDRAULICS ENGINEERING (C210)

C210.1	Describe the basics of open channel flow, its classification and analysis of uniform flow in steady state conditions with specific energy concept and its application
C210.2	Analyse steady gradually varied flow, water surface profiles and its length calculation using direct and standard step methods with change in water surface profiles due to change in grades
C210.3	Derive the relationship among the sequent depths of steady rapidly varied flow and estimating energy loss in hydraulic jump with exposure to positive and negative surges.
C210.4	Design turbines and explain the working principle
C210.5	Differentiate pumps and explain the working principle with characteristic curves and design centrifugal and reciprocating pumps.

## CE3402 STRENGTH OF MATERIALS (C211)

C211.1	Understand the concepts of stress and strain, principal stresses and principal planes
C211.2	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.
C211.3	Calculate the deflection of beams by different methods and selection of method for determining slope or deflection
C211.4	Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements.
C211.5	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and study the various theories of failure

## CE3403 CONCRETE TECHNOLOGY (C212)

C212.1	Understand the requirements of cement, aggregates and water for concrete
C212.2	Select suitable admixtures for enhancing the properties of concrete
C212.3	Design concrete mixes as per IS method of mix design
C212.4	Determine the properties of concrete at fresh and hardened state
C212.5	Know the importance of special concretes for specific requirements

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DEPARTMENT OF CIVIL ENGINEERING

## CE3404 SOIL MECHANICS. (C213)

C213.1	Demonstrate an ability to identify various types of soils and its properties, formulate and solve engineering Problems
C213.2	Show the basic understanding of flow through soil medium and its impact of engineering solution
C213.3	Understand the basic concept of stress distribution in loaded soil medium and soil settlement due to consolidation
C213.4	Show the understanding of shear strength of soils and its impact of engineering solutions to the loaded soil medium and also will be aware of contemporary issues on shear strength of soils.
C213.5	Demonstrate an ability to design both finite and infinite slopes, component and process as per needs and specifications.

## CE3405 HIGHWAY AND RAILWAY ENGINEERING (C214)

C214.1	Plan a highway according to the principles and standards adopted in various institutions in India
C214.2	Design the geometric features of road network and components of pavement.
C214.3	Test the highway materials and construction practice methods and know its properties and able to perform pavement evaluation and management.
C214.4	Understand the methods of route alignment and design elements in railway planning and constructions.
C214.5	Understand the construction techniques and maintenance of track laying and railway stations

## GE3451 ENVIRONMENTAL SCIENCES AND SUSTAINABILITY (C215)

C215.1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation
C215.2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
C215.3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
C215.4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
C215.5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

Head of Department

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DEPARTMENT OF CIVIL ENGINEERING

## CE3411 HYDRAULIC ENGINEERING LABORATORY (C216)

C216.1	Apply Bernoulli equation for calibration of flow measuring devices.
C216.2	Measure friction factor in pipes and compare with Moody diagram.
C216.3	Determine the performance characteristics of rotodynamic pumps
C216.4	Determine the performance characteristics of positive displacement pumps.
C216.5	Determine the performance characteristics of turbines

## CE3412 MATERIALS TESTING LABORATORY (C217)

C217.1	Determine the mechanical properties of steel.
C217.2	Determine the physical properties of cement
C217.3	Determine the physical properties of fine and coarse aggregate
C217.4	Determine the workability and compressive strength of concrete
C217.5	Determine the strength of brick and wood.

## CE3413 SOIL MECHANICS LABORATORY (C218)

C218.1	Conduct tests to determine the index properties of soils
C218.2	Determine the insitu density and compaction characteristics
C218.3	Conduct tests to determine the compressibility, permeability and shear strength of soils
C218.4	Understand the various tests on Geosynthetics.

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DEPARTMENT OF CIVIL ENGINEERING

## CE3501 DESIGN OF REINFORCED CONCRETE STRUCTURAL ELEMENTS (C301)

C301.1	Know the various design concepts and design RC rectangular beams by working stress and limit state methods
C301.2	Understand the design of flanged beams, design for shear and torsion, and anchorage and development length
C301.3	Design a RC slabs and staircase and draw the reinforcement detailing
C301.4	Design short columns for axial, uni-axial and bi-axial eccentric loadings
C301.5	Design wall footings, isolated footings and combined rectangular footing.

## CE3502 STRUCTURAL ANALYSIS I (C302)

C302.1	Analyze the pin-jointed plane and space frames
C302.2	Analyze the continuous beams and rigid frames by slope deflection method
C302.3	Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway
C302.4	Analyze the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.
C302.5	Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.

## CE3503 FOUNDATION ENGINEERING (C303)

C303.1	Ability to plan and execute a detailed site investigation to select geotechnical design parameters and type of foundation.
C303.2	Design shallow foundations, its component or process as per the needs and specifications.
C303.3	Design combined footings and raft foundations, its component or process as per the needs and specifications
C303.4	Demonstrate an ability to design deep foundations, its component or process as per the needs and specifications.
C303.5	Acquire knowledge on retaining walls, its component or process as per the needs and specifications.

  
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DEPARTMENT OF CIVIL ENGINEERING

## CE3511 HIGHWAY ENGINEERING LABORATORY (C304)

C304.1	Characterize Pavement Aggregate through relevant test.
C304.2	Ascertain the Quality of Bitumen
C304.3	Determine the Optimum Binder Content Using Marshall Method
C304.4	Evaluate the Consistency and Properties of Bitumen
C304.5	Determine the Bitumen Content in the Bituminous Mixes

## CE3512 SURVEY CAMP (C305)

C305.1	Handle the modern surveying instruments like Total station and GPS
C305.2	Apply modern surveying techniques in field to establish horizontal control.
C305.3	Understand the surveying techniques in field to establish vertical control.
C305.4	Apply different survey adjustment techniques
C305.5	Carry out different setting out works in the field

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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**REGULATION-2021**

**COURSE OUTCOMES**

**MA3354 - Discrete Mathematics - [C201]**

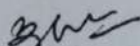
C201.1	Make use of propositions, predicates and flow of logical proofs.
C201.2	Acquire knowledge on induction and counting principles and to solve recurrence relation.
C201.3	Perceive the knowledge of various types and characteristics of graphs.
C201.4	Interpret concepts and properties of groups, rings and fields.
C201.5	Comprehend the ideas of lattices and Boolean algebra.

**CS3351 - Digital Principles and Computer Organization - [C202]**

C202.1	Design various combinational digital circuits using logic gates.
C202.2	Design sequential circuits and analyze the design procedures.
C202.3	State the fundamentals of computer systems and analyze the execution of an instruction.
C202.4	Analyze different types of control design and identify hazards.
C202.5	Identify the characteristics of various memory systems and I/O communication.

**CS3352 - Foundations of Data Science- [C203]**

C203.1	Define the data science process.
C203.2	Understand different types of data description for data science process.
C203.3	Gain knowledge on relationships between data.
C203.4	Use the Python Libraries for Data Wrangling.
C203.5	Apply visualization Libraries in Python to interpret and explore data.

  
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

**CS3301- Data Structures - [C204 ]**

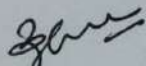
C204.1	Define linear and non-linear data structures.
C204.2	Implement linear and non-linear data structure operations.
C204.3	Use appropriate linear/non-linear data structure operations for solving a given problem.
C204.4	Apply appropriate graph algorithms for graph applications.
C204.5	Analyze the various searching and sorting algorithms.

**CS3391 - Object Oriented Programming - [C205]**

C205.1	Apply the concepts of classes and objects to solve simple problems.
C205.2	Develop programs using inheritance, packages and interfaces.
C205.3	Make use of exception handling mechanisms and multithreaded model to solve real world problems.
C205.4	Build Java applications with I/O packages, string classes, Collections and generics concepts.
C205.5	Integrate the concepts of event handling and JavaFX components and controls for developing GUI based applications.

**CS3311 - Data Structures Laboratory- [C206]**

C206.1	Implement Linear data structure algorithms.
C206.2	Implement applications using Stacks and Linked lists.
C206.3	Implement Binary Search tree and AVL tree operations.
C206.4	Implement graph algorithms.
C206.5	Analyze the various searching and sorting algorithms.

  
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**CS3381 - Object Oriented Programming Laboratory – [C207]**

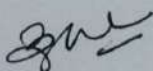
C207.1	Design and develop java programs using object oriented programming concepts.
C207.2	Develop simple applications using package, exceptions, Inheritance.
C207.3	Implement multithreading, and generics concepts, file operations.
C207.4	Create GUIs and event driven programming applications for real world problems.
C207.5	Implement and deploy web applications using Java.

**CS3361 - Data Science Laboratory– [C208]**

C208.1	Make use of the python libraries for data science.
C208.2	Make use of the basic Statistical and Probability measures for data science.
C208.3	Perform descriptive analytics on the benchmark data sets.
C208.4	Perform correlation and regression analytics on standard data sets.
C208.5	Present and interpret data using visualization packages in Python.

**GE3361 - Professional Development– [C209]**

C209.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements.
C209.2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding.
C209.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.

  
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**CS3452 - Theory of Computation– [C210]**

C210.1	Construct automata theory using Finite Automata.
C210.2	Write regular expressions for any pattern.
C210.3	Design context free grammar and Pushdown Automata.
C210.4	Design Turing machine for computational functions.
C210.5	Differentiate between decidable and undecidable problems.

**CS3491 Artificial Intelligence and Machine Learning – [C211]**

C211.1	Use appropriate search algorithms for problem solving.
C211.2	Apply reasoning under uncertainty.
C211.3	Build supervised learning models.
C211.4	Build ensembling and unsupervised models.
C211.5	Build deep learning neural network models.

**CS3492 Database Management Systems– [C212]**

C212.1	Construct SQL Queries using relational algebra.
C212.2	Design database using ER model and normalize the database.
C212.3	Construct queries to handle transaction processing and maintain consistency of the database.
C212.4	Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database.
C212.5	Appraise how advanced databases differ from Relational Databases and find a suitable database for the given requirement.

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**CS3401 - Algorithms – [C213]**

C213.1	Analyze the efficiency of algorithms using various frameworks.
C213.2	Apply graph algorithms to solve problems and analyze their efficiency.
C213.3	Make use of algorithm design techniques like divide and conquer, dynamic programming and greedy techniques to solve problems.
C213.4	Use the state space tree method for solving problems.
C213.5	Solve problems using approximation algorithms and randomized algorithms.

**CS3451 - Introduction to Operating Systems– [C214]**

C214.1	Explain the basic concepts ,functions of Operating Systems and system calls.
C214.2	Analyse various scheduling algorithms, process synchronization and Explain deadlock prevention and avoidance algorithms.
C214.3	Compare and contrast various memory management schemes.
C214.4	Explain the functionality of file systems, I/O systems, and Virtualization.
C214.5	Compare iOS and Android Operating Systems.

**GE3451 - Environmental Sciences and Sustainability– [C215]**

C215.1	Understand how interactions between organisms and their environments drive the dynamics of individuals, populations, communities, and ecosystems.
C215.2	Able to understand the offensive effects of pollution in the day-to-day life.
C215.3	Able to understand the need of new renewable energy resources - its management and conservation.
C215.4	Explore the problems we face in understanding our natural environment and in living sustainability.
C215.5	Understand the Importance and also the the techniques to protect natural Resources.

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**CS3461 - Operating Systems Laboratory– [C216]**

C216.1	Install windows operating system, Define and implement UNIX Commands and shell programming.
C216.2	Compare the performance of various CPU Scheduling Algorithms. To implement Deadlock Avoidance and Deadlock Detection Algorithms.
C216.3	Implement the paging Technique ,Compare and contrast various Memory Allocation Methods and various Page Replacement Algorithms.
C216.4	Define File Organization and File Allocation Strategies.
C216.5	Implement various Disk Scheduling Algorithms.

**CS3481- Database Management Systems Laboratory– [C217]**

C217.1	Create databases with different types of key constraints.
C217.2	Construct simple and complex SQL queries using DML and DCL commands.
C217.3	Use advanced features such as stored procedures and triggers and incorporate in GUI based application development.
C217.4	Create an XML database and validate with meta-data (XML schema).
C217.5	Create and manipulate data using NOSQL database.

**CS3591 - Computer Networks – [C301]**

C301.1	Illustrate the functionality of OSI models and discuss the working of various application layer protocols.
C301.2	Understand the transport layer protocols.
C301.3	Explain the different services of the network layer.
C301.4	Analyze routing algorithms.
C301.5	Evaluate the performance of the data link layer and physical layer.

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**CS3501 - Compiler Design- [C302]**

C302.1	Understand the techniques in different phases of a compiler & Design a lexical analyser for a sample language and learn to use the LEX tool.
C302.2	Apply different parsing algorithms to develop a parser and learn to use YACC tool.
C302.3	Understand semantics rules (SDT - SYNTAX DIRECTED TRANSLATION) and intermediate code generation.
C302.4	Understand run-time environment and implement code generation techniques.
C302.5	Apply code optimization techniques.

**CB3491 - Cryptography and Cyber Security – [C303]**

C303.1	Understand the fundamentals of networks security, security architecture, threats and vulnerabilities.
C303.2	Apply the different cryptographic operations of symmetric cryptographic algorithms.
C303.3	Apply the different cryptographic operations of public key cryptography.
C303.4	Apply the various Authentication schemes to simulate different applications.
C303.5	Understand various cybercrimes and cyber security.

**CS3551 - Distributed Computing- [C304]**

C304.1	Explain the foundations of distributed systems.
C304.2	Solve synchronization and state consistency problems.
C304.3	Use resource sharing techniques in distributed systems.
C304.4	Apply working model of consensus and reliability of distributed systems.
C304.5	Explain the fundamentals of cloud computing.

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**CCS369 -Text and Speech Analysis– [C305]**

C305.1	Understand the basics of Natural Language Processing.
C305.2	Apply deep learning techniques for NLP tasks, language modelling and machine translation.
C305.3	Build question-answering systems, chatbots and dialogue systems.
C305.4	Apply deep learning models for building text-to-speech systems.
C305.5	Apply deep learning models for building speech recognition systems.

**CCS375- Web Technologies– [C306]**

C306.1	Construct a basic website using HTML and Cascading Style Sheets.
C306.2	Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.
C306.3	Develop server side programs using Servlets and JSP.
C306.4	Construct simple web pages in PHP and to represent data in XML format.
C306.5	Develop interactive web applications.

**MX3084 - Disaster Risk Reduction and Management– [C307]**

C307.1	To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR).
C307.2	To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction.
C307.3	To develop disaster response skills by adopting relevant tools and technology.
C307.4	Enhance awareness of institutional processes for Disaster response in the country.
C307.5	Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity.

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Year/Semester: II yr/III Sem  
Course Name: Signals and Systems (EC3354)

Course Code: C203

**Course Outcomes**

At the end of the course, the student will be able to

C203.1	determine if a given system is linear/causal/stable
C203.2	determine the frequency components present in a deterministic signal
C203.3	characterize continuous LTI systems in the time domain and frequency domain
C203.4	characterize discrete LTI systems in the time domain and frequency domain
C203.5	compute the output of an LTI system in the time and frequency domains

**CO PO Mapping**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C203.1	3	-	3	-	3	2	-	-	-	-		3
C203.2	3	-	3	-	-	2	-	-	-	-		3
C203.3	3	3	-	-	3	2	-	-	-	-		3
C203.4	3	3	-	-	3	2	-	-	-	-		3
C203.5	3	3	-	3	3	2	-	-	-	-		3
<b>C203</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3</b>

**CO-PSO Mapping**

CO	PSO1	PSO2	PSO3
C203.1	-	-	1
C203.2	-	3	-
C203.3	2	-	-
C203.4	-	3	1
C203.5	-	3	1
<b>C203</b>	<b>2</b>	<b>3</b>	<b>1</b>

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Year/Semester: II yr/III Sem  
Course Name: Electronic Devices and Circuits (EC3353)

Course Code: C204

**Course Outcomes**

At the end of the course, the student will be able to

C204.1	Explain the structure and working operation of basic electronic devices
C204.2	Design and analyze amplifiers
C204.3	Analyze frequency response of BJT and MOSFET amplifiers
C204.4	Design and analyze feedback amplifiers and oscillator principles
C204.5	Design and analyze power amplifiers and supply circuits

**CO-PO Mapping**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C204.1	3	3	3	3	2	1	-	-	-	-	-	1
C204.2	3	2	2	3	2	2	-	-	-	-	-	1
C204.3	3	3	3	2	1	2	-	-	-	-	-	1
C204.4	3	3	2	3	2	2	-	-	-	-	-	1
C204.5	3	2	3	2	2	1	-	-	-	-	-	1
C204	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	-	-	-	-	-	<b>1</b>

**CO-PSO Mapping**

CO	PSO1	PSO2	PSO3
C204.1	2	1	1
C204.2	2	1	1
C204.3	2	1	1
C204.4	2	1	1
C204.5	2	1	1
C204	<b>2</b>	<b>1</b>	<b>1</b>

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Year/Semester: II yr/III Sem  
Course Name: Control Systems (EC3351)

Course Code: C205

**Course Outcomes**

At the end of the course, the student will be able to

C205.1	Compute the transfer function of different physical systems
C205.2	Analyse the time domain specification and calculate the steady state error
C205.3	Illustrate the frequency response characteristics of open loop and closed loop system response
C205.4	Analyse the stability using Routh and root locus techniques
C205.5	Illustrate the state space model of a physical system and discuss the concepts of sampled data control system

**CO-PO Mapping**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C205.1	3	3	3	2	2	2	-	-	-	-	2	3
C205.2	3	3	3	3	2	3	-	-	-	-	2	2
C205.3	3	2	3	3	2	2	-	-	-	-	2	3
C205.4	3	3	3	2	2	2	-	-	-	-	2	2
C205.5	2	2	3	3	2	3	-	-	-	-	2	3
C205	3	3	3	3	2	2	-	-	-	-	2	3

**CO-PSO Mapping**

CO	PSO1	PSO2	PSO3
C205.1	3	3	2
C205.2	3	2	2
C205.3	2	3	2
C205.4	3	3	2
C205.5	3	3	2
C205	3	3	2

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Year/Semester: II yr/III Sem  
Course Name: Digital Systems Design (EC3352)

Course Code: C206

**Course Outcomes**

At the end of the course, the student will be able to

C206.1	Use Boolean algebra and simplification procedures relevant to digital logic
C206.2	Design various combinational digital circuits using logic gates.
C206.3	Analyse and design synchronous sequential circuits
C206.4	Analyse and design asynchronous sequential circuits
C206.5	Build logic gates and use programmable devices

**CO-PO Mapping**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C206.1	3	3	3	2	2	2	-	-	-	-	3	3
C206.2	3	2	2	2	2	2	-	-	-	-	2	1
C206.3	3	3	3	1	2	2	-	-	-	-	2	2
C206.4	3	3	2	2	2	2	-	-	-	-	3	2
C206.5	3	2	3	2	2	2	-	-	-	-	2	2
<b>C206</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	-	-	-	-	<b>2</b>	<b>2</b>

**CO PSO Mapping**

CO	PSO1	PSO2	PSO3
C206.1	3	3	2
C206.2	2	3	2
C206.3	3	3	2
C206.4	2	3	1
C206.5	3	3	2
<b>CO</b>	<b>3</b>	<b>3</b>	<b>2</b>

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Year/Semester: II yr/III Sem

Course Code: C201

Course Name: Random Processes and Linear Algebra (MA3355)

**Course Outcomes**

At the end of the course, the student will be able to

C201.1	Understand the fundamental concepts of probability with a thorough knowledge of standard distributions that can describe certain real-life phenomenon.
C201.2	Understand the basic concepts of one and two dimensional random variables and apply them to model engineering problems.
C201.3	Apply the concept of random processes in engineering disciplines.
C201.4	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
C201.5	Demonstrate accurate and efficient use of advanced algebraic techniques.

**CO-PO Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C201.1	3	3	2	2	1	-	-	-	-	-	-	1
C201.2	3	3	2	2	1	-	-	-	-	-	-	1
C201.3	3	3	2	2	1	-	-	-	-	-	-	1
C201.4	3	3	2	2	1	-	-	-	-	-	-	1
C201.5	3	3	2	2	1	-	-	-	-	-	-	1
C201	3	3	2	2	1	-	-	-	-	-	-	1

**CO-PSO Mapping**

CO	PSO1	PSO2	PSO3
C201.1	1	-	-
C201.2	1	-	-
C201.3	1	-	-
C201.4	1	-	-
C201.5	1	-	-
C201	1	-	-

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Year/Semester: II yr/III Sem  
Course Name: C Programming And Data Structures (CS3353)

Course Code: C202

**Course Outcomes**

At the end of the course, the student will be able to

C202.1	Develop C programs for any real world/technical application.
C202.2	Apply advanced features of C in solving problems.
C202.3	Write functions to implement linear data structure operations and suggest and use appropriate operations for solving a given problem.
C202.4	Write functions to implement tree operations and apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.
C202.5	Appropriately use sort and search algorithms for a given application.

**CO-PO Mapping**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C202.1	2	2	2	-	-	-	-	-	-	-	-	-
C202.2	2	2	2	-	-	-	-	-	-	-	-	-
C202.3	2	2	2	-	-	-	-	-	-	-	-	-
C202.4	2	2	2	-	-	-	-	-	-	-	-	-
C202.5	2	2	2	-	-	-	-	-	-	-	-	-
C202	2	2	2	-	-	-	-	-	-	-	-	-

**CO-PSO Mapping**

CO	PSO1	PSO2	PSO3
C202.1	-	1	-
C202.2	-	1	-
C202.3	1	1	-
C202.4	1	1	-
C202.5	1	1	-
C202	1	1	-

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Year/Semester: II yr/IV Sem

Course Code: C210

Course Name: Electromagnetic Fields (EC3452)

Course Code:C210

**Course Outcomes**

At the end of the course, the student will be able to

C210.1	Relate the fundamentals of vector, coordinate system to electromagnetic concepts
C210.2	Analyze the characteristics of Electrostatic field and Interpret the concepts of Electric field in material space and solve the boundary conditions
C210.3	Explain the concepts and characteristics of Magneto Static field in material space and solve boundary conditions.
C210.4	Determine the significance of time varying fields
C210.5	Analyze the propagation of EM waves in lossy and lossless media.

**CO PO Mapping:**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C210.1	3	3	2	3	2	-	-	-	1	1	1	1
C210.2	3	3	2	3	2	3	1	1	1	1	1	1
C210.3	3	3	2	3	2	3	1	1	1	1	1	1
C210.4	3	3	2	3	2	3	1	1	1	1	1	1
C210.5	3	3	2	3	2	3	1	1	1	1	1	1
CO	<b>3</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>

**CO-PSO Mapping:**

CO	PSO1	PSO2	PSO3
C210.1	-	-	-
C210.2	3	3	2
C210.3	3	3	2
C210.4	3	3	2
C210.5	3	3	2
CO	<b>2</b>	<b>1</b>	<b>1</b>

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**CO PO MAPPING, CO-PSO MAPPING**

Year/Semester: II yr/IV Sem  
Course Name: Networks and Security (EC3401)

Course Code: C211

Course Outcomes

At the end of the course, the student will be able to

C211.1	: Explain the Network Models, layers and functions.
C211.2	Categorize and classify the routing protocols.
C211.3	List the functions of the transport and application layer
C211.4	Evaluate and choose the network security mechanisms.
C211.5	Discuss the hardware security attacks and countermeasures.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C211.1	3	3	3	3	2	1	-	-	-	-	-	1
C211.2	3	2	2	3	2	2	-	-	-	-	-	1
C211.3	3	3	3	2	1	2	-	-	-	-	-	1
C211.4	3	3	2	3	2	2	-	-	-	-	-	1
C211.5	3	2	3	2	2	1	-	-	-	-	-	1
C211	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	-	-	-	-	-	<b>1</b>

CO-PSO Mapping

CO	PSO1	PSO2	PSO3
C211.1	2	1	1
C211.2	2	1	1
C211.3	2	1	1
C211.4	2	1	1
C211.5	2	1	1
C211	<b>2</b>	<b>1</b>	<b>1</b>

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Year/Semester: II yr/IV Sem  
Course Name: Linear Integrated Circuits (EC3451)

Course Code: C212

**Course Outcomes**

At the end of the course, the student will be able to

C212.1	Design linear and nonlinear applications of OP – AMPS
C212.2	Design applications using analog multiplier and PLL
C212.3	Design ADC and DAC using OP – AMPS
C212.4	Generate waveforms using OP – AMP Circuits
C212.5	Analyze special function ICs

**CO-PO Mapping**

C	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C212.1	3	3	3	3	3	2	-	-	-	-	1	2
C212.2	3	2	2	3	2	1	-	-	-	-	1	2
C212.3	3	2	3	2	2	2	-	-	-	-	1	1
C212.4	3	2	2	2	3	1	-	-	-	-	1	1
C212.5	2	2	3	2	3	2	-	-	-	-	1	1
<b>C212</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>1</b>	-	-	-	-	<b>1</b>	<b>1</b>

**CO-PSO Mapping**

CO	PSO1	PSO2	PSO3
C212.1	2	1	1
C212.2	2	1	1
C212.3	2	1	1
C212.4	2	1	1
C212.5	2	1	1
<b>C212</b>	<b>2</b>	<b>1</b>	<b>1</b>

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Year/Semester: II yr/IV Sem  
Course Name: Digital Signal Processing (EC3492)

Course Code: C213

**Course Outcomes**

At the end of the course, the student will be able to

C213.1	Apply DFT for the analysis of digital signals and systems
C213.2	Design IIR and FIR filters
C213.3	Characterize the effects of finite precision representation on digital filters
C213.4	Design multirate filters
C213.5	Apply adaptive filters appropriately in communication systems

**CO-PO Mapping**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C213.1	3	3	3	3	2	2	-	-	-	-	2	2
C213.2	3	3	3	3	2	2	-	-	-	-	2	2
C213.3	3	3	3	3	2	2	-	-	-	-	2	2
C213.4	3	3	3	2	3	2	-	-	-	-	1	2
C213.5	3	2	2	2	3	2	-	-	-	-	1	2
<b>C213</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>2</b>

**CO-PSO Mapping**

CO	PSO1	PSO2	PSO3
C213.1	3	3	2
C213.2	2	2	2
C213.3	1	2	3
C213.4	2	1	2
C213.5	2	2	1
<b>C213</b>	<b>2</b>	<b>2</b>	<b>2</b>

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Year/Semester: II yr/IV Sem  
Course Name: Communication Systems (EC3491)

Course Code: C214

**Course Outcomes**

At the end of the course, the student will be able to

C214.1	Gain knowledge in amplitude modulation techniques
C214.2	Understand the concepts of Random Process to the design communication systems
C214.3	Gain knowledge in digital techniques
C214.4	Understand and analyze digital modulation techniques
C214.5	Understand the importance of demodulation techniques

**CO-PO Mapping:**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C214.1	3	2	2	1	3	2	-	-	-	-	-	3
C214.2	3	3	3	3	3	2	-	-	-	-	-	3
C214.3	3	2	2	1	3	2	-	-	-	-	-	3
C214.4	3	3	3	3	3	2	-	-	-	-	-	3
C214.5	3	3	3	3	3	2	-	-	-	-	-	3
<b>C214</b>	<b>3</b>	<b>2.6</b>	<b>2.6</b>	<b>2.2</b>	<b>3</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3</b>

**CO-PSO Mapping:**

CO	PSO1	PSO2	PSO3
C214.1	2	3	3
C214.2	3	3	3
C214.3	2	3	3
C214.4	3	3	3
C214.5	3	3	3
<b>C214</b>	<b>2.6</b>	<b>3</b>	<b>3</b>

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Year/Semester: II yr/IV Sem

Course Code: C215

Course Name: Environmental Sciences and Sustainability (GE3451)

**Course Outcomes**

At the end of the course, the student will be able to

C215.1	
C215.2	
C215.3	
C215.4	
C215.5	

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**REGULATION – 2021**  
**COURSE OUTCOMES**  
**MA3354 -Discrete Mathematics [C201]**

C201.1	Make use of propositions, predicates and flow of logical proofs
C201.2	Acquire knowledge on induction and counting principles and to solve recurrence relation.
C201.3	Perceive the knowledge of various types and characteristics of graphs.
C201.4	Interpret concepts and properties of groups, rings and fields.
C201.5	Comprehend the ideas of lattices and Boolean algebra

**CS3351–Digital Principles and Computer Organization [C202]**

C202.1	Design various combinational digital circuits using logic gates
C202.2	Design sequential circuits and analyze the design procedures
C202.3	State the fundamentals of computer systems and analyze the execution of an instruction
C202.4	Analyze different types of control design and identify hazards
C202.5	Identify the characteristics of various memory systems and I/O communication

**CS3352- Foundations of Data Science [C203]**

C203.1	Define the data science process
C203.2	Understand different types of data description for data science process
C203.3	Gain knowledge on relationships between data
C203.4	Use the Python Libraries for Data Wrangling
C203.5	Apply visualization Libraries in Python to interpret and explore data

**CD3291- Data Structures and Algorithms [C204]**

C204.1	Explain abstract data types.
C204.2	Design, implement, and analyze linear data structures, such as lists, queues, and stacks, according to the needs of different applications
C204.3	Design, implement, and analyze efficient tree structures to meet requirements such as searching, indexing, and sorting
C204.4	Model problems as graph problems and implement efficient graph algorithms to solve them

**CS3391- Object Oriented Programming [C205]**

C205.1	Apply the concepts of classes and objects to solve simple problems
C205.2	Develop programs using inheritance, packages and interfaces
C205.3	Make use of exception handling mechanisms and multithreaded model to solve real world problems
C205.4	Build Java applications with I/O packages, string classes, Collections and generics concepts
C205.5	Integrate the concepts of event handling and JavaFX components and controls for developing GUI based applications

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**CD3281- Data Structures and Algorithms Laboratory [C206]**

C206.1	Implement ADTs as Python classes.
C206.2	Design, implement, and analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications
C206.3	Design, implement, and analyse efficient tree structures to meet requirements such as searching, indexing, and sorting
C206.4	Model problems as graph problems and implement efficient graph algorithms to solve them

**CS3381-Object Oriented Programming Laboratory[C207]**

C207.1	Design and develop java programs using object oriented programming concepts
C207.2	Develop simple applications using object oriented concepts such as package, exceptions
C207.3	Implement multithreading, and generics concepts
C207.4	Create GUIs and event driven programming applications for real world problems
C207.5	Implement and deploy web applications using Java

**CS3361 -Data Science Laboratory [C208]**

C208.1	Make use of the python libraries for data science
C208.2	Make use of the basic Statistical and Probability measures for data science.
C208.3	Perform descriptive analytics on the benchmark data sets
C208.4	Perform correlation and regression analytics on standard data sets
C208.5	Present and interpret data using visualization packages in Python.

**GE3361- Professional Development [C209]**

C209.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
C209.2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
C209.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects

**CS3452-Theory of Computation [C210]**

C210.1	Construct automata theory using Finite Automata
C210.2	Write regular expressions for any pattern
C210.3	Design context free grammar and Pushdown Automata
C210.4	Design Turing machine for computational functions
C210.5	Differentiate between decidable and undecidable problems

  
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**CS3491- Artificial Intelligence and Machine Learning [C211]**

C211.1	Use appropriate search algorithms for problem solving
C211.2	Apply reasoning under uncertainty
C211.3	Build supervised learning models
C211.4	Build ensembling and unsupervised models
C211.5	Build deep learning neural network models

**CS3492- Database Management Systems [C212]**

C212.1	Construct SQL Queries using relational algebra
C212.2	Design database using ER model and normalize the database
C212.3	Construct queries to handle transaction processing and maintain consistency of the database
C212.4	Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database
C212.5	Appraise how advanced databases differ from Relational Databases and find a suitable database for the given requirement.

**IT3401- Web Essentials [C213]**

C213.1	Apply JavaScript, HTML and CSS effectively to create interactive and dynamic websites
C213.2	Create simple PHP scripts
C213.3	Design and deploy simple web-applications.
C213.4	Create simple database applications.
C213.5	Handle multimedia components

**CS3451- Introduction to Operating Systems [C214]**

C214.1	Analyze various scheduling algorithms and process synchronization.
C214.2	Explain deadlock prevention and avoidance algorithms
C214.3	Compare and contrast various memory management schemes
C214.4	Explain the functionality of file systems, I/O systems, and Virtualization
C214.5	Compare iOS and Android Operating Systems

**GE3451- Environmental Sciences and Sustainability [C215]**

C215.1	Understand how interactions between organisms and their environments drive the dynamics of individuals, populations, communities, and ecosystems
C215.2	Able to understand the offensive effects of pollution in the day-to-day life.
C215.3	Able to understand the need of new renewable energy resources - its management and conservation
C215.4	Explore the problems we face in understanding our natural environment and in living sustainability.
C215.5	Understand the Importance and also the techniques to protect natural Resources.

  
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**CS3461- Operating Systems Laboratory[C216]**

C216.1	Define and implement UNIX Commands.
C216.2	Compare the performance of various CPU Scheduling Algorithms.
C216.3	Compare and contrast various Memory Allocation Methods.
C216.4	Define File Organization and File Allocation Strategies.
C216.5	Implement various Disk Scheduling Algorithms.

**CS3481- Database Management Systems Laboratory [C217]**

C217.1	Create databases with different types of key constraints
C217.2	Construct simple and complex SQL queries using DML and DCL commands.
C217.3	Use advanced features such as stored procedures and triggers and incorporate in GUI based application development.
C217.4	Create an XML database and validate with meta-data (XML schema).
C217.5	Create and manipulate data using NOSQL database.

**CS3591- Computer Networks [C301]**

C301.1	Explain the basic layers and its functions in computer networks.
C301.2	Understand the basics of how data flows from one node to another.
C301.3	Analyze routing algorithms.
C301.4	Describe protocols for various functions in the network.
C301.5	Analyze the working of various application layer protocols.


**IT3501- Full Stack Web Development [C302]**

C302.1	Understand the various stacks available for web application development
C302.2	Use Node.js for application development
C302.3	Develop applications with MongoDB
C302.4	Use the features of Angular and Express
C302.5	Develop React applications

**CS3551- Distributed Computing[C303]**

C303.1	Explain the foundations of distributed systems (K2)
C303.2	Solve synchronization and state consistency problems (K3)
C303.3	Use resource sharing techniques in distributed systems (K3)
C303.4	Apply working model of consensus and reliability of distributed systems (K3)
C303.5	Explain the fundamentals of cloud computing (K2)

  
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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

LIST OF COURSES

REGULATION: 2021

I SEM TO V SEM

S.NO	COURSE CODE	SUBJECT CODE	SUBJECT NAME
<b>SEMESTER- I</b>			
1	C101	HS3151	Professional English - I
2	C102	MA3151	Matrices and Calculus
3	C 103	PH3151	Engineering Physics
4	C 104	CY3151	Engineering Chemistry
5	C 105	GE315	Problem Solving and Python Programming
6	C 106	GE3171	Problem Solving and Python Programming Laboratory
7	C 107	BS3171	Physics And Chemistry Laboratory
8	C108	HS3251	Professional English - II
<b>SEMESTER-II</b>			
10	C108	HS3251	Professional English - II
11	C109	MA3251	Statistics and Numerical Methods
12	C110	PH3256	Physics for Information Science
13	C111	BE3251	Basic Electrical and Electronics Engineering
14	C112	GE3251	Engineering Graphics
15	C113	AD3251	Data Structures Design
16	C114	GE3271	Engineering Practices Laboratory
17	C115	AD3271	Data Structures Design Laboratory
<b>SEMESTER-III</b>			
18	C201	MA3354	Discrete Mathematics
19	C202	CS351	Digital Principles And Computer Organization
21	C203	AD3391	Database Design And Management
22	C204	AD3351	Design And Analysis Of Algorithms
23	C205	AD3301	Data Exploration And Visualization
24	C206	AL3391	Artificial Intelligence
25	C207	AD3381	Database Design And Management Laboratory
26	C208	AD3311	Artificial Intelligence Laboratory



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<b>SEMESTER-IV</b>			
28	C210	MA3391	Probability And Statistics
29	C211	AL3452	Operating Systems
30	C212	AL3451	Machine Learning
31	C213	AD3491	Fundamentals Of Data Science And Analytics
32	C214	CS3591	Computer Networks
33	C215	GE3451	Environmental Sciences And Sustainability
34	C216	AD3411	Data Science And Analytics Laboratory
35	C217	AD3461	Machine Learning Laboratory
<b>SEMESTER-V</b>			
36	C218	AD3501	Deep Learning
37	C219	CW3551	Data And Information Security
38	C220	CS3551	Distributed Computing
39	C221	CCS334	Big Data Analytics
40	C223	CCS347	Game Development
41	C224	CCS341	Data Warehousing
42	C225	MX3084	Disaster Risk Reduction And Management
42	C226	AD3511	Deep Learning Laboratory
43	C227	AD3512	Summer Internship

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

I SEMESTER

**HS3151-Professional English - I [C101]**

<b>C101.1</b>	To listen and comprehend complex academic texts.
<b>C101.2</b>	To read and infer the denotative and connotative meanings of technical texts.
<b>C101.3</b>	To write definitions, descriptions, narrations and essays on various topics.
<b>C101.4</b>	To speak fluently and accurately in formal and informal communicative contexts
<b>C101.5</b>	To express their opinions effectively in both oral and written medium of communication.

**MA3151-Matrices and Calculus [C102]**

<b>C102.1</b>	To find eigenvalues and eigen vectors of a matrix ,diagonalize symmetric matrix.
<b>C102.2</b>	Acquire the knowledge of Limit definition and differentiation rules to differentiate the functions.
<b>C102.3</b>	Examine the concepts of functions of several variables and to find extremum value of a given function.
<b>C102.4</b>	Evaluate the integrals by using Riemann sum and Fundamental theorem of Calculus.
<b>C102.5</b>	Develop an ability to trace the curve and find area , volume using multiple integrals.

**PH3151-Engineering Physics [C103]**

<b>C103.1</b>	Effectively understand the importance of Mechanics.
<b>C103.2</b>	Gain knowledge of electromagnetic waves and its applications.
<b>C103.3</b>	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
<b>C103.4</b>	Understand the importance of quantum physics.
<b>C103.5</b>	Comprehend and apply quantum mechanical principles towards the formation of energy bands.



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**CY3151 -Engineering Chemistry [C104]**

<b>C104.1</b>	Water treatment techniques will facilitate better understanding of engineering processes and applications for further learning
<b>C104.2</b>	The students will gain knowledge on the basics of properties of nano materials and its applications
<b>C104.3</b>	The students will acquire knowledge on the concepts of composites and phase rule and their applications in compound formation,
<b>C104.4</b>	The knowledge gained on engineering materials, fuels, energy sources will facilitate future learning
<b>C104.5</b>	The students will have adequate knowledge on the concepts of nuclear energy, batteries and their application in energy production

**GE3151- Problem Solving and Python Programming [C105]**

<b>C105.1</b>	Develop algorithmic Designs to simple computational problems.
<b>C105.2</b>	Develop simple statements of python programs for mathematical Expressions.
<b>C105.3</b>	Implement control flow and function concepts for developing Python programs.
<b>C105.4</b>	Understanding Python data structures - lists, tuples & dictionaries for handling compound data.
<b>C105.5</b>	Handling files, exception, modules and packages in Python for solving problems.

**GE3171 – Problem Solving and Python Programming Laboratory – [C106]**

<b>C106.1</b>	Develop algorithmic solutions to execute simple computational Python programs.
<b>C106.2</b>	Implement programs in Python using conditionals and loops for solving problems real time scenarios.
<b>C106.3</b>	Deploy functions to decompose a Python program in real time mathematical applications.
<b>C106.4</b>	Process compound data using Python data structures by Utilize Python packages in developing software applications.



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**BS3171– Physics and Chemistry Laboratory – [C107]**

<b>C107.1</b>	The hands on exercises undergone by students will help them to apply physics principles of optics Out filled with hands on knowledge about pH and conductometric titration
<b>C107.2</b>	Acquire knowledge about the modulus of elasticity and able to apply them in the field. The basic concepts on argentometric titration helps in flouride estimation.
<b>C107.3</b>	Assess the behaviour of columns, beams and failures of materials. The basic idea on Potentiometric titration will help the adequate knowledge EMF measurement.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

## II SEMESTER

### HS3251 - Professional English - II [C108]

C108.1	Compare and Contrast the product and ideas and how to apply in their academic, professional and personal life.
C108.2	Identify cause and effects in events, industrial processes as well competency in reporting the events, documentaries, biographies, travelogue, news and technical blogs in oral and written communication.
C108.3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format and diction for accurate description of a process or product through all four skills(LSRW).
C108.4	Report events and the processes of technical and industrial nature and identify the core ideas of various topics in TED talks, scientific lectures, newspaper articles, journals and educational videos and give formal and informal presentations on the same
C108.5	Express and present their opinions, views and ideas diligently in debates, discussions and role plays, and draft clear & concise recommendations and newspaper articles in a logical manner.

### MA3251 - Statistics and Numerical Methods [C109]

C109.1	Analyse the statistical data and apply various small and large sample test for testing the hypothesis.
C109.2	Adapt Design of Experiments using analysis of variance to test the hypothesis.
C109.3	Use numerical methods to solve algebraic and transcendental equations and to find Eigen value of a matrix.
C109.4	Estimate the unknown intermediate values through interpolation and calculate the derivatives, the length and area of irregular objects using numerical differentiation and integration.
C109.5	Determine numerical solutions of ordinary differential equations.

### PH3256- Physics for Information Science - [C110]

C110.1	Gain knowledge on classical and quantum electron theories, and energy band structures.
C110.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices.
C110.3	Get knowledge on magnetic properties of materials and their applications in data storage.
C110.4	Have the necessary understanding on the functioning of optical materials for optoelectronics.
C110.5	Understand the basics of quantum structures and their applications and basics of quantum computing



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**BE3251-Basic Electrical and Electronics Engineering -[C111]**

<b>C111.1</b>	Able to understand the basic electric circuit laws and Compute the electric circuit parameters for simple problems using Nodal and Mesh methods.
<b>C111.2</b>	Able to understand the concepts of domestics wiring and protective devices.
<b>C111.3</b>	Able to understand the working principle, characteristics and applications of a.c and d.c electrical machines
<b>C111.4</b>	Able to analyse the characteristics of diodes, Transistors, MOSFET, IGBT and SCR.
<b>C111.5</b>	Able to understand the types and operating principles of different sensors and variable transducers.

**GE3251- Engineering Graphics– [C112]**

<b>C112.1</b>	Understand BIS conventions and appropriately demonstrated and also construct the profile of Engineering Conic Curves
<b>C112.2</b>	Identify, explain and represent the orthographic views of projection of Points in all four quadrants, and Projection of lines and Planes in two dimensional plane.
<b>C112.3</b>	Draw the concept of orthographic views from pictorial views, models, and projection of Solids
<b>C112.4</b>	Draw the sectional views of solids, to identify the true shape of cut surfaces and also to develop the surfaces of cut solids
<b>C112.5</b>	Draw the nature of cut surfaces in isometric vews & projections, and also to visualize the perspective projection of simple solids.

**GE3271-Engineering Practices Laboratory-[C114]**

<b>C114.1</b>	Ability to draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; can able to do Sawing; planning; making joints in wood materials used in common household wood work.
<b>C114.2</b>	Ability to do house wiring and can measure energy.
<b>C114.3</b>	Ability to do arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipment and can do Making a tray out of metal sheet using sheet metal work.
<b>C114.4</b>	Ability to do soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.



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**AD3271-Data Structures Design Laboratory-[ C115]**

<b>C115.1</b>	implement ADTs as Python classes
<b>C115.2</b>	design, implement, and analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications
<b>C115.3</b>	design, implement, and analyse efficient tree structures to meet requirements such as searching, indexing, and sorting
<b>C115.4</b>	model problems as graph problems and implement efficient graph algorithms to solve them

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### **III SEMESTER**

#### **MA3354 DISCRETE MATHEMATICS-[C201]**

<b>C201.1</b>	Have knowledge of the concepts needed to test the logic of a program.
<b>C201.2</b>	Have an understanding in identifying structures on many levels.
<b>C201.3</b>	Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.
<b>C201.4</b>	Be aware of the counting principles
<b>C201.5</b>	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

#### **CS3351 DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION-[C202]**

<b>C202.1</b>	Design various combinational digital circuits using logic gates
<b>C202.2</b>	Design sequential circuits and analyze the design procedures
<b>C202.3</b>	State the fundamentals of computer systems and analyze the execution of an instruction
<b>C202.4</b>	Analyze different types of control design and identify hazards
<b>C202.5</b>	Identify the characteristics of various memory systems and I/O communication

#### **AD3391 DATABASE DESIGN AND MANAGEMENT-[C203]**

<b>C203.1</b>	Understand the database development life cycle and apply conceptual modelling
<b>C203.2</b>	Apply SQL and programming in SQL to create, manipulate and query the database
<b>C203.3</b>	Apply the conceptual-to-relational mapping and normalization to design relational database
<b>C203.4</b>	Determine the serializability of any non-serial schedule using concurrency techniques
<b>C203.5</b>	Apply the data model and querying in Object-relational and No-SQL databases

#### **AD3351 DESIGN AND ANALYSIS OF ALGORITHMS-[C204]**

<b>C204.1</b>	Analyze the efficiency of recursive and non-recursive algorithms mathematically
<b>C204.2</b>	Analyze the efficiency of brute force, divide and conquer, decrease and conquer, Transform and conquer algorithmic techniques



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<b>C204.3</b>	Implement and analyze the problems using dynamic programming and greedy algorithmic techniques.
<b>C204.4</b>	Solve the problems using iterative improvement techniques for optimization.
<b>C204.5</b>	Compute the limitations of algorithmic power and solve the problems using backtracking and branch and bound techniques

**AD3301 DATA EXPLORATION AND VISUALIZATION- [C205]**

<b>C205.1</b>	Understand the fundamentals of exploratory data analysis.
<b>C205.2</b>	Implement the data visualization using Matplotlib.
<b>C205.3</b>	Perform univariate data exploration and analysis.
<b>C205.4</b>	Apply bivariate data exploration and analysis.
<b>C205.5</b>	Use Data exploration and visualization techniques for multivariate and time series data.

**AL3391 ARTIFICIAL INTELLIGENCE- [C206]**

<b>C206.1</b>	Explain intelligent agent frameworks
<b>C206.2</b>	Apply problem solving techniques
<b>C206.3</b>	Apply game playing and CSP techniques
<b>C206.4</b>	Perform logical reasoning
<b>C206.5</b>	Perform probabilistic reasoning under uncertainty

**AD3381 DATABASE DESIGN AND MANAGEMENT LABORATORY- [C207]**

<b>C207.1</b>	Understand the database development life cycle
<b>C207.2</b>	Design relational database using conceptual-to-relational mapping, Normalization
<b>C207.3</b>	Apply SQL for creation, manipulation and retrieval of data
<b>C207.4</b>	Develop a database applications for real-time problems
<b>C207.5</b>	Design and query object-relational databases

**AD3311 ARTIFICIAL INTELLIGENCE LABORATORY [C208]**

<b>C208.1</b>	Design and implement search strategies
<b>C208.2</b>	Implement game playing and CSP techniques
<b>C208.3</b>	Develop logical reasoning systems
<b>C208.4</b>	Develop probabilistic reasoning systems

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#### IV SEMESTER

##### MA3391 PROBABILITY AND STATISTICS-[C210]

<b>C210.1</b>	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
<b>C210.2</b>	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications
<b>C210.3</b>	Apply the concept of testing of hypothesis for small and large samples in real life problems.
<b>C210.4</b>	Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control
<b>C210.5</b>	Have the notion of sampling distributions and statistical techniques used in engineering and management problems.

##### AL3452 OPERATING SYSTEMS-[C211]

<b>C211.1</b>	Analyze various scheduling algorithms and process synchronization
<b>C211.2</b>	Explain deadlock, prevention and avoidance algorithms.
<b>C211.3</b>	Compare and contrast various memory management schemes
<b>C211.4</b>	Explain the functionality of file systems I/O systems, and Virtualization
<b>C211.5</b>	Compare iOS and Android Operating Systems.

##### AL3451 MACHINE LEARNING-[C212]

<b>C212.1</b>	Explain the basic concepts of machine learning
<b>C212.2</b>	Construct supervised learning models
<b>C212.3</b>	Construct unsupervised learning algorithms
<b>C212.4</b>	Evaluate and compare different models
<b>C212.5</b>	

##### AD3491 FUNDAMENTALS OF DATA SCIENCE AND ANALYTICS-[C213]

<b>C213.1</b>	Explain the data analytics pipeline
<b>C213.2</b>	Describe and visualize data
<b>C213.3</b>	Perform statistical inferences from data
<b>C213.4</b>	Analyze the variance in the data
<b>C213.5</b>	Build models for predictive analytics



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CS3591 COMPUTER NETWORKS-[C214]**

<b>C214.1</b>	Explain the basic layers and its functions in computer networks.
<b>C214.2</b>	Understand the basics of how data flows from one node to another
<b>C214.3</b>	Analyze routing algorithms
<b>C214.4</b>	Describe protocols for various functions in the network
<b>C214.5</b>	Analyze the working of various application layer protocols

**GE3451 ENVIRONMENTAL SCIENCES AND SUSTAINABILITY-[C215]**

<b>C215.1</b>	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation
<b>C215.2</b>	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society
<b>C215.3</b>	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
<b>C215.4</b>	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
<b>C215.5</b>	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

**AD3411 DATA SCIENCE AND ANALYTICS LABORATORY-[C216]**

<b>C216.1</b>	Write python programs to handle data using Numpy and Pandas
<b>C216.2</b>	Perform descriptive analytics
<b>C216.3</b>	Perform data exploration using Matplotlib
<b>C216.4</b>	Perform inferential data analytics
<b>C216.5</b>	Build models of predictive analytics

**AD3461 MACHINE LEARNING LABORATORY-[C217]**

<b>C217.1</b>	Apply suitable algorithms for selecting the appropriate features for analysis.
<b>C217.2</b>	Implement supervised machine learning algorithms on standard datasets and evaluate the performance.
<b>C217.3</b>	Apply unsupervised machine learning algorithms on standard datasets and evaluate the performance.
<b>C217.4</b>	Build the graph based learning models for standard data sets.
<b>C217.5</b>	Assess and compare the performance of different ML algorithms and select the suitable one based on the application

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**V SEMESTER**

**AD3501 DEEP LEARNING-[C301]**

<b>C301.1</b>	Explain the basics in deep neural networks
<b>C301.2</b>	Apply Convolution Neural Network for image processing
<b>C301.3</b>	Apply Recurrent Neural Network and its variants for text analysis
<b>C301.4</b>	Apply model evaluation for various applications
<b>C301.5</b>	Apply autoencoders and generative models for suitable applications

**CW3551 DATA AND INFORMATION SECURITY-[C302]**

<b>C302.1</b>	Understand the basics of data and information security
<b>C302.2</b>	Understand the legal, ethical and professional issues in information security
<b>C302.3</b>	Understand the various authentication schemes to simulate different applications.
<b>C302.4</b>	Understand various security practices and system security standards
<b>C302.5</b>	Understand the Web security protocols for E-Commerce applications

**CS3551 DISTRIBUTED COMPUTING-[C303]**

<b>C303.1</b>	Explain the foundations of distributed systems
<b>C303.2</b>	Solve synchronization and state consistency problems
<b>C303.3</b>	Use resource sharing techniques in distributed systems
<b>C303.4</b>	Apply working model of consensus and reliability of distributed systems
<b>C303.5</b>	Explain the fundamentals of cloud computing

**CCS334 BIG DATA ANALYTICS-[C304]**

<b>C304.1</b>	Describe big data and use cases from selected business domains
<b>C304.2</b>	Explain NoSQL big data management
<b>C304.3</b>	Install, configure, and run Hadoop and HDFS
<b>C304.4</b>	Perform map-reduce analytics using Hadoop.
<b>C304.5</b>	Use Hadoop-related tools such as HBase, Cassandra, Pig, and Hive for big data analytics





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**CCS347 GAME DEVELOPMENT[C305]**

<b>C305.1</b>	Explain the concepts of 2D and 3D Graphics
<b>C305.2</b>	Design game design documents
<b>C305.3</b>	Implementation of gaming engines.
<b>C305.4</b>	Survey gaming environments and frameworks
<b>C305.5</b>	Implement a simple game in Pygame.

**CCS341 DATA WAREHOUSING-[C306]**

<b>C306.1</b>	Design data warehouse architecture for various Problems
<b>C306.2</b>	Apply the OLAP Technology
<b>C306.3</b>	Analyse the partitioning strategy
<b>C306.4</b>	Critically analyze the differentiation of various schema for given problem
<b>C306.5</b>	Frame roles of process manager & system manager

**MX3084 DISASTER RISK REDUCTION AND MANAGEMENT-[C307]**

<b>C307.1</b>	To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)
<b>C307.2</b>	To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction
<b>C307.3</b>	To develop disaster response skills by adopting relevant tools and technology
<b>C307.4</b>	Enhance awareness of institutional processes for Disaster response in the country and
<b>C307.5</b>	Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity

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## DEPARTMENT OF HUMANITIES AND SCIENCE (B.E. CIVIL ENGINEERING)

### REGULATION – 2017 COURSE OUTCOMES (CO)

#### HS8151- Communicative English [C101]

C101.1	Ability to speak/write clearly, confidently, comprehensively and communicate with one or many using appropriate.
C101.2	Ability to read and write cohesively and coherently avoiding grammatical errors, using a wide range of vocabulary and organizing the ideas logically on a given topic.
C101.3	Interpret different genres of texts adopting various reading strategies and to write comprehensively
C101.4	Ability to listen/view and comprehend different spoken discourses/excerpts different accents and to write clearly in simple language.
C101.5	Ability to speak/write elaborately on the ideas and opinions relevant in different situations

#### MA8151- Engineering Mathematics – I [C102]

C102.1	Acquire the knowledge of Limit definition and differentiation rules to differentiate the functions.
C102.2	Examine the concepts of functions of several variables and to find extremum value of a given function
C102.3	Evaluate the integrals by using Riemann sum and Fundamental theorem of Calculus.
C102.4	Develop an ability to trace the curve and find area, volume using multiple integrals.
C102.5	Apply various techniques in solving differential equations.

#### PH8151-Engineering Physics [C103]

C103.1	Acquire knowledge on the basics of properties of matter and its applications,
C103.2	Develop knowledge on the concepts of laser and their applications in fibre optics communication.
C103.3	Analyse the concepts of thermal properties of materials and apply them accordingly
C103.4	Incorporate the advanced physics concepts of quantum theory and their applications
C103.5	Summarize the basics of crystals, their structures and different crystal growth techniques.

#### CY8151 -Engineering Chemistry (C104)

C104.1	Water treatment techniques will facilitate better understanding of engineering processes and applications for further learning
C104.2	The basics of properties of matter and its applications will gain knowledge on better understanding of Engineering Process
C104.3	The concepts of alloys and phase rule and their applications in compound formation will facilitate better applications for further learning
C104.4	The knowledge gained on engineering materials, fuels, energy sources will facilitate future learning.
C104.5	The concepts of nuclear energy, batteries will recognize different forms energy resources for suitable applications in energy sectors.



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#### GE8151- Problem Solving And Python Programming -[C105]

C105.1	Develop algorithmic solutions to simple computational problems.
C105.2	Demonstrate programs using simple Python statements and expressions.
C105.3	Implement control flow and functions concept in Python for solving problems.
C105.4	Use Python data structures – lists, tuples & dictionaries for representing compound data.
C105.5	Use files, exception, modules and packages in Python for solving problems.

#### GE8152- Engineering Graphics [C106]

C106.1	Familiarize with the fundamentals and standards of Engineering drawings and Perform freehand sketching of basic geometrical constructions and multiple views of objects.
C106.2	Draw orthographic projections of lines and plane surfaces.
C106.3	Draw projections of solids.
C106.4	Draw projection of sectioned solids and development of surfaces.
C106.5	Visualize and project isometric and perspective sections of simple solids.

#### GE8161 – Problem Solving And Python Programming Laboratory – (C107)

C107.1	Write, test, and debug simple Python programs.
C107.2	Implement Python programs with conditionals and loops.
C107.3	Develop Python programs step-wise by defining functions and calling them.

#### BS8161– Physics And Chemistry Laboratory – (C108)

C108.1	The hands on exercises undergone by the students will help them to apply physics principles of optics Outfitted with hands-on knowledge about pH and conductometric titration
C108.2	Acquire knowledge about the modulus of elasticity and able to apply them in the field The basic concepts on argentometric titration helps in Chloride estimation
C108.3	Assess the behaviour of columns, beams and failures of materials. The basic idea on Potentiometric titration will help to get the adequate knowledge on Emf measurements

  
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#### HS8251 - Technical English (C109)

C109.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, argue using appropriate communicative.
C109.2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
C109.3	Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
C109.4	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings
C109.5	Ability to speak/write elaborately on the ideas and opinions relevant in different situations.

#### MA8251 Engineering Mathematics – II [C110]

C110.1	To find eigenvalues, eigenvectors, canonical form and inverse of a matrix.
C110.2	Estimate vector identities and interpret some integral theorems in a vector field.
C110.3	Identify and construct analytic function and application of conformal mapping.
C110.4	Apply complex integration to evaluate contour integrals.
C110.5	Examine the concepts of Laplace transformation and solve differential equations with given boundary conditions..

#### PH8201 Physics For Civil Engineering - [C111]

C111.1	Express knowledge on the thermal performance of buildings.
C111.2	Knowledge on the acoustic properties of buildings.
C111.3	Interprets on various lighting designs for buildings.
C111.4	Properties and performance of engineering materials.
C111.5	Understand the Earthquake effect and other hazards of buildings.

#### BE8251 – Basic Electrical And Electronics Engineering – [C112]

C112.1	Explain the basic theorems used in Electrical circuits
C112.2	Understand the different components and function of electrical machines.
C112.3	Explain the fundamentals of semiconductor and applications.
C112.4	Explain the principles of digital electronics
C112.5	Impart knowledge of communication.

  
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#### GE8291-Environmental Science And Engineering – [C113]

C113.1	Gain knowledge on flora and fauna in our environment helps to know about social environment
C113.2	Gain knowledge on the offensive effects of pollution in the day-to-day life.
C113.3	Acquire knowledge on the natural resources available and their conservation.
C113.4	Have adequate knowledge on the concepts of adverse effects of social issues like acid rain and global warming
C113.5	Get knowledge about the Over Population, causes and Effects and the Solutions to overcome the problems due to Population.

#### GE8292 - Engineering Mechanics - [C114]

C114.1	Illustrate the vectorial and scalar representation of forces and to solve problems with the basic concepts of particle mechanics.
C114.2	Analyse the rigid body under static equilibrium
C114.3	Evaluate the properties of surfaces and solids such as centroid, moment of inertia, centre of gravity and mass moment of inertia
C114.4	Analyse the rigid body under dynamic equilibrium
C114.5	Solve problems involving kinetics of rigid bodies with and without friction

#### GE8261- Engineering Practices Laboratory – (C115)

C115.1	Study and practice on machine tools and their operations.
C115.2	Practice on carpentry tools, components and pipe connections including plumbing work.
C115.3	Demonstrate wiring for a simple residential house, identify the ratings of various appliances like Fluorescent tube, incandescent lamp, etc.
C115.4	Calculate the different Electrical quantities, measure the energy consumption using single phase energy meter, measure the resistance to earth of an electrical equipment.
C115.5	Analyze the characteristics of basic electronic devices.
C115.6	Elaborate on the components, gates, soldering practices

#### CE8211 – Computer Aided Building Drawing-[C116]

C116.1	Sketch simple figures with title block using AutoCAD software command
C116.2	Sketch curves like parabola, spiral and involute of square & circle and draw the orthographic projection of simple solids.
C116.3	Prepare orthographic projection of simple machine parts and draw a plan of residential building.
C116.4	Sketch simple steel truss and sectional views of simple solids.
C116.5	Prepare 2D multi view drawing from 3D model.

  
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DEPARTMENT OF HUMANITES AND SCIENCE  
(BE COMPUTER SCIENCE AND ENGINEERING)

## REGULATION – 2017

### HS8151- Communicative English [C101]

C101.1	Ability to speak/write clearly, confidently, comprehensively and communicate with one or many using appropriate.
C101.2	Ability to read and write cohesively and coherently avoiding grammatical errors ,using a wide range of vocabulary and organizing the ideas logically on a given topic.
C101.3	Interpret different genres of texts adopting various reading strategies and to write comprehensively
C101.4	Ability to listen/view and comprehend different spoken discourses/excerpts different accents and to write clearly in simple language.
C101.5	Ability to speak/write elaborately on the ideas and opinions relevant in different situations

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C102.2	Examine the concepts of functions of several variables and to find extremum value of a given function
C102.3	Evaluate the integrals by using Riemann sum and Fundamental theorem of Calculus.
C102.4	Develop an ability to trace the curve and find area, volume using multiple integrals.
C102.5	Apply various techniques in solving differential equations.

### PH8151- Engineering Physics [C103]

C103.1	Acquire knowledge on the basics of properties of matter and its applications,
C103.2	Develop knowledge on the concepts of laser and their applications in fibre optics communication.
C103.3	Analyse the concepts of thermal properties of materials and apply them accordingly
C103.4	Incorporate the advanced physics concepts of quantum theory and their applications
C103.5	Summarize the basics of crystals, their structures and different crystal growth techniques.

  
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## CY8151- Engineering Chemistry[C104]

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C104.2	The basics of properties of matter and its applications will gain knowledge on better understanding of Engineering Process.
C104.3	The concepts of alloys and phase rule and their applications in compound formation will facilitate better applications for further learning.
C104.4	The knowledge gained on engineering materials, fuels, energy sources will facilitate future learning.
C104.5	The concepts of nuclear energy, batteries will recognize different forms energy resources for suitable applications in energy sectors..

## GE8151- Problem Solving &Python Programming [C105]

C105.1	Develop algorithmic solutions to simple computational problems
C105.2	Demonstrate programs using simple Python statements and expressions.
C105.3	Implement control flow and functions concept in Python for solving problems.
C105.4	Use Python data structures – lists, tuples & dictionaries for representing compound data.
C105.5	Use files, exception, modules and packages in Python for solving problems.

## GE8152- Engineering Graphics [C106]

C106.1	Familiarize with the fundamentals and standards of Engineering drawings and Perform freehand sketching of basic geometrical constructions and multiple views of objects.
C106.2	Draw orthographic projections of lines and plane surfaces.
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C106.5	Visualize and project isometric and perspective sections of simple solids.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
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## GE8161- Problem Solving and Python Programming Laboratory [C107]

C107.1	Write, test, and debug simple Python programs.
C107.2	Implement Python programs with conditionals and loops.
C107.3	Develop Python programs step-wise by defining functions and calling them.
C107.4	Use Python lists, tuples, dictionaries for representing compound data.
C107.5	Read and write data from/to files in Python

## BS 8161- Physics & Chemistry Laboratory [C108]

C108.1	The hands on exercises undergone by the students will help them to apply physics principles of optics. Outfitted with hands on knowledge about pH and conductometric titration
C108.2	Acquire knowledge about the modulus of elasticity and able to apply them in the field The basic concepts on argentometric titration helps in fluoride estimation.
C108.3	Assess the behavior of columns, beams and failures of materials The basic idea on Potentiometric titration will help the adequate knowledge EMF measurement.

## HS8251-Technical English-II [C109]

C109.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, argue using appropriate communicative.
C109.2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
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C110.4	Apply complex integration to evaluate contour integrals.

  
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## DEPARTMENT OF HUMANITES AND SCIENCE (BE COMPUTER SCIENCE AND ENGINEERING)

C110.5	Examine the concepts of Laplace transformation and solve differential equations with given boundary conditions.
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### PH8252-Physics for Information Science[C111]

C111.1	Gain knowledge on classical and quantum electron theories, and energy band structures
C111.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices
C111.3	Get knowledge on magnetic properties of materials and their applications in data storage
C111.4	Have the necessary understanding on the functioning of optical materials for optoelectronics
C111.5	Understand the basics of quantum structures and their applications in carbon electronics

### BE8255-Basic Electrical, Electronics and Measurement Engineering[C112]

C112.1	To discuss the essentials of electric circuits and analysis.
C112.2	To discuss the basic operation of electric machines and transformers.
C112.3	To analyse the introduction of renewable sources and domestic loads
C112.4	To understand the fundamentals of electronic circuit constructions.
C112.5	To give the introduction to measurement and metering for electric circuits

### GE 8291-Environmental Science & Engineering [C113]

C113.1	Gain knowledge on flora and fauna in our environment helps to know about social environment
C113.2	Gain knowledge on the offensive effects of pollution in the day-to-day life.
C113.3	Acquire knowledge on the natural resources available and their conservation.
C113.4	Have adequate knowledge on the concepts of adverse effects of social issues like acid rain and global warming
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DEPARTMENT OF HUMANITIES AND SCIENCE  
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## CS8251-Programming in C[C114]

C114.1	Simple applications in C using basic constructs
C114.2	Have a strategy to design and implement applications using arrays and strings
C114.3	Understand and implement applications in C using functions and pointers
C114.4	Knowing Applications in C using structures.
C114.5	Design applications using sequential and random access file processing.

## GE8261-Engineering Practices Laboratory [C115]

C115.1	Study and practice on machine tools and their operations
C115.2	Ability to fabricate carpentry components and pipe connections including plumbing work
C115.3	Demonstrate wiring for a simple residential house, identify the ratings of various appliances like Fluorescent tube, incandescent lamp, etc.
C115.4	Calculate the different Electrical quantities, measure the energy consumption using single phase energy meter, measure the resistance to earth of an electrical equipment.
C115.5	Analyze the characteristics of basic electronic devices.

## CS8261-C Programming Laboratory[C116]

C116.1	Develop C programs for simple applications making use of basic constructs, arrays and strings.
C116.2	Develop C programs involving functions, recursion, pointers, and structures.
C116.3	Design applications using sequential and random access file processing

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
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## REGULATION – 2017

### HS8151 - Communicative English [C101]

C101.1	Ability to speak/write clearly, confidently, comprehensively and communicate with one or many using appropriate.
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C101.4	Ability to listen/view and comprehend different spoken discourses/excerpts different accents and to write clearly in simple language.
C101.5	Ability to speak/write elaborately on the ideas and opinions relevant in different situations.

### MA8151 - Engineering Mathematics I [C102]

C102.1	Acquire the knowledge of Limit definition and differentiation rules to differentiate the functions.
C102.2	Examine the concepts of functions of several variables and to find extremum value of a given function.
C102.3	Evaluate the integrals by using Riemann sum and Fundamental theorem of Calculus.
C102.4	Develop an ability to trace the curve and find area, volume using multiple integrals.
C102.5	Apply various techniques in solving differential equations.

### PH8151 - Engineering Physics [C103]

C103.1	Acquire knowledge on the basics of properties of matter and its applications.
C103.2	Develop knowledge on the concepts of waves and optical devices and their applications in fibre optics.
C103.3	Analyse the concepts of thermal properties of materials and apply them accordingly.
C103.4	Incorporate the advanced physics concepts of quantum theory and their applications.
C103.5	Summarize the basics of crystals, their structures and different crystal growth techniques.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
BE (ELECTRONICS AND COMMUNICATION ENGINEERING)  
CY8151 - Engineering Chemistry [C104]

C104.1	Water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
C104.2	The basics of properties of matter and its applications will gain knowledge on better understanding of engineering process.
C104.3	The concepts of alloys and phase rule and their applications in compound formation will facilitate better applications for further learning.
C104.4	The knowledge gained on engineering materials, fuels, energy sources will facilitate future learning.
C104.5	The concepts of nuclear energy, batteries will recognize different forms energy resources for suitable in energy sectors.

## GE8151 -Problem Solving And Python Programming [C105]

C105.1	Develop algorithmic solutions to simple computational problems.
C105.2	Demonstrate programs using simple Python statements and expressions.
C105.3	Implement control flow and functions concept in Python for solving problems.
C105.4	Use Python data structures – lists, tuples & dictionaries for representing compound data.
C105.5	Use files, exception, modules and packages in Python for solving problems.

## GE8152 – Engineering Graphics [C106]

C106.1	Familiarize with the fundamentals and standards of Engineering drawings and Perform freehand sketching of basic geometrical constructions and multiple views of objects.
C106.2	Draw orthographic projections of lines and plane surfaces.
C106.3	Draw projections of solids.
C106.4	Draw projection of sectioned solids and development of surfaces.
C106.5	Visualize and project isometric and perspective sections of simple solids.

## GE8161 -Problem Solving And Python Programming Laboratory [C107]

C107.1	Write, test, and debug simple Python programs.
C107.2	Implement Python programs with conditionals and loops.
C107.3	Develop Python programs step-wise by defining functions and calling them.

## BS8161 – Physics And Chemistry Laboratory [C108]

C108.1	The hands on exercises undergone by the students will help them to apply physics principles of optics. Outfitted with hands-on knowledge about pH and conductometric titration
C108.2	Acquire knowledge about the modulus of elasticity and able to apply them in the field. The basic concepts on argentometric titration helps in Chloride estimation.
C108.3	Assess the behaviour of columns, beams and failures of materials. The basic idea on Potentiometric titration will help to get the adequate knowledge on Emf measurements

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
BE (ELECTRONICS AND COMMUNICATION ENGINEERING)

HS8251 – Technical English [C109]

C109.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, argue using appropriate communicative.
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C109.4	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
C109.5	Ability to speak/write elaborately on the ideas and opinions relevant in different situations.

## MA8251 – Engineering Mathematics - II [C110]

C110.1	To find eigenvalues, eigenvectors, canonical form and inverse of a matrix.
C110.2	Estimate vector identities and interpret some integral theorems in a vector field.
C110.3	Identify and construct analytic function and application of conformal mapping.
C110.4	Apply complex integration to evaluate contour integrals.
C110.5	Examine the concepts of Laplace transformation and solve differential equations with given boundary conditions.

## PH8253 – Physics for Electronics Engineering - [C111]

C111.1	Express their knowledge about the conducting materials and their properties.
C111.2	Interpret the fundamental knowledge about the semiconductors and able to differentiate different types of semiconductors.
C111.3	Understand the magnetic and dielectric properties of materials.
C111.4	Acquire knowledge on properties of optical materials and the functioning of optical materials for optoelectronic devices.
C111.5	Understand about the basics of quantum structures and their applications and also acquire the knowledge about the nano-electronic materials and devices for various applications.

## BE8254 - Basic Electrical & Instrumentation Engineering [C112]

C112.1	The students will be able to illustrate the concept of three phase power circuits and power system
C112.2	The students will be able to illustrate the concepts in circuit model of transformers
C112.3	The students will be able to illustrate the concept in DC machines and its applications
C112.4	The students will be able to illustrate the concept in AC machines and its applications
C112.5	The students will be able to outline appropriate measuring instruments for given application

  
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## DEPARTMENT OF HUMANITIES AND SCIENCE BE (ELECTRONICS AND COMMUNICATION ENGINEERING) EE8251 – Circuit Analysis [C113]

C113.1	Apply basic circuit laws to analyse AC and DC circuits and understand the network topologies in graph theory.
C113.2	Apply various network theorems to solve the electrical parameters for a given circuit.
C113.3	Understand the concept of resonance, inductance and coupled circuits.
C113.4	Analyse the time response of circuits with passive components using laplace transformation.
C113.5	Derive the various two port network parameters for a given circuit.

## EC8252 – Electronic Devices [C114]

C114.1	To get familiar with the theory, operations of PN Junction Diode.
C114.1	To explain the construction, operations of Bipolar Junction Transistor
C114.1	To explain the constructions, operations of Field Effect Transistor.
C114.1	To illustrate the concept and operations of Special Semiconductor Diode.
C114.1	To explain the theory, operations of photo devices and power devices

## EC8261 – Circuits and Devices Laboratory [C115]

C115.1	Analyze the characteristics of basic electronic devices
C115.2	Design RL and RC circuits
C115.3	Verify Thevenin & Norton theorem KVL & KCL, and Super Position Theorems
C115.4	Verify Kirchoff's law.

## GE8261 – Engineering Practices Laboratory [C116]

C116.1	Study and practice on machine tools and their operations
C116.2	Ability to fabricate carpentry components and pipe connections including plumbing work. Ability to use welding equipment to join the structures.
C116.3	Understand basic house electrical wirings.
C116.4	Measure various electrical quantities like voltage, current, power, power factor, energy etc.
C116.5	Analyze the characteristics of basic electronic devices
C116.6	Elaborate on the components, gates, soldering practices

  
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#### REGULATION – 2017 COURSE OUTCOMES (CO) HS8151- Communicative English [C101]

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### DEPARTMENT OF HUMANITIES AND SCIENCE (B.E. ELECTRICAL AND ELECTRONICS ENGINEERING)

#### GE8151- Problem Solving And Python Programming -[C105]

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C111.3	Understand the magnetic and dielectric properties of materials
C111.4	Acquire knowledge on properties of optical materials and the functioning of optical materials for optoelectronic devices.
C111.5	Understand about the basics of quantum structures and their applications and also acquire the knowledge about the nano-electronic materials and devices for various applications.

#### BE8252 – Basic civil and Mechanical Engineering– [C112]

C112.1	Appreciate the Civil and Mechanical Engineering components of Projects
C112.2	Explain the usage of construction material and proper selection of construction materials
C112.3	Measure distances and area by surveying.
C112.4	Identify the components used in power plant cycle. Demonstrate working principles of petrol and diesel engine.
C112.5	Elaborate the components of refrigeration and Air conditioning cycle..

#### EE8251 - Circuit Theory – [C113]

C113.1	Able to understand fundamental laws and analyse electrical circuits with different techniques
C113.2	Able to gain conceptual knowledge in solving circuits by applying network reduction techniques and network theorems
C113.3	Able to analyse and estimate the transient response using Laplace transform.
C113.4	Able to develop understanding of three phase circuits ,balanced and unbalanced conditions
C113.5	Able to interpret the concept of resonance and coupled circuits.

  
HoD

  
Principal

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**DEPARTMENT OF HUMANITIES AND SCIENCE  
(B.E. ELECTRICAL AND ELECTRONICS ENGINEERING)**

**MA8251 Engineering Mathematics – II [C110]**

C110.1	To find eigenvalues, eigenvectors, canonical form and inverse of a matrix.
C110.2	Estimate vector identities and interpret some integral theorems in a vector field.
C110.3	Identify and construct analytic function and application of conformal mapping.
C110.4	Apply complex integration to evaluate contour integrals.
C110.5	Examine the concepts of Laplace transformation and solve differential equations with given boundary conditions..

**PH8253 Physics for Electronics Engineering - [C111]**

C111.1	Express their knowledge about the conducting materials and their properties.
C111.2	Interpret the fundamental knowledge about the semiconductors and able to differentiate different types of semiconductors
C111.3	Understand the magnetic and dielectric properties of materials
C111.4	Acquire knowledge on properties of optical materials and the functioning of optical materials for optoelectronic devices.
C111.5	Understand about the basics of quantum structures and their applications and also acquire the knowledge about the nano-electronic materials and devices for various applications.

**BE8252 – Basic civil and Mechanical Engineering– [C112]**

C112.1	Appreciate the Civil and Mechanical Engineering components of Projects
C112.2	Explain the usage of construction material and proper selection of construction materials
C112.3	Measure distances and area by surveying.
C112.4	Identify the components used in power plant cycle. Demonstrate working principles of petrol and diesel engine.
C112.5	Elaborate the components of refrigeration and Air conditioning cycle..

**EE8251 - Circuit Theory – [C113]**

C113.1	Able to understand fundamental laws and analyse electrical circuits with different techniques
C113.2	Able to gain conceptual knowledge in solving circuits by applying network reduction techniques and network theorems
C113.3	Able to analyse and estimate the transient response using Laplace transform.
C113.4	Able to develop understanding of three phase circuits ,balanced and unbalanced conditions
C113.5	Able to interpret the concept of resonance and coupled circuits.

  
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## DEPARTMENT OF HUMANITIES AND SCIENCE (B.E. ELECTRICAL AND ELECTRONICS ENGINEERING)

### GE8291-Environmental Science And Engineering - [C114]

C114.1	Gain knowledge on flora and fauna in our environment helps to know about social environment.
C114.2	Gain knowledge on the offensive effects of pollution in the day-to-day life.
C114.3	Acquire knowledge on the natural resources available and their conservation
C114.4	Have adequate knowledge on the concepts of adverse effects of social issues like acid rain and global warming
C114.5	Get knowledge about the Over Population, causes and Effects and the Solutions to overcome the problems due to Population

### GE8261- Engineering Practices Laboratory – (C115)

C115.1	Study and practice on machine tools and their operations.
C115.2	Practice on carpentry tools, components and pipe connections including plumbing work.
C115.3	Demonstrate wiring for a simple residential house, identify the ratings of various appliances like Fluorescent tube, incandescent lamp, etc.
C115.4	Calculate the different Electrical quantities, measure the energy consumption using single phase energy meter, measure the resistance to earth of an electrical equipment.
C115.5	Analyze the characteristics of basic electronic devices.
C115.6	Elaborate on the components, gates, soldering practices

### EE8261 – Electric circuits Laboratory -[C116]

C116.1	Able to simulate electrical circuits and to experimentally verify various theorems for circuit designing
C116.2	To gain practical knowledge regarding the frequency response and transients in passive elements.
C116.3	To be able to simulate the resonance circuits for several applications such as designing of tuning circuit, signal processing and voltage magnification.
C116.4	Perform the simulation of three phase circuits using suitable simulation for both balanced and unbalanced condition.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
(B.TECH. INFORMATION TECHNOLOGY )

REGULATION – 2017

COURSE OUTCOMES(CO)

**HS8151-Communicative English[C101]**

C101.1	Ability to speak/write clearly, confidently, comprehensively and communicate with one or many using appropriate.
C101.2	Ability to read and write cohesively and coherently avoiding grammatical errors ,using a wide range of vocabulary and organizing the ideas logically on a given topic.
C101.3	Interpret different genres of texts adopting various reading strategies and to write comprehensively.
C101.4	Ability to listen/view and comprehend different spoken discourses/excerpts different accents and to write clearly in simple language.
C101.5	Ability to speak/write elaborately on the ideas and opinions relevant in different situations.

**MA8151-Engineering Mathematics-1[C102]**

C102.1	Acquire the knowledge of Limit definition and differentiation rules to differentiate the functions.
C102.2	Examine the concepts of functions of several variables and to find extremum value of a given function.
C102.3	Evaluate the integrals by using Riemann sum and Fundamental theorem of Calculus.
C102.4	Develop an ability to trace the curve and find area , volume using multiple integrals.
C102.5	Apply various techniques in solving differential equations.

**PH8151-Engineering Physics[C103]**

C103.1	Acquire knowledge on the basics of properties of matter and its applications,
C103.2	Develop knowledge on the concepts of laser and their applications in fibre optics communication.
C103.3	Analyse the concepts of thermal properties of materials and apply them accordingly
C103.4	Incorporate the advanced physics concepts of quantum theory and their applications
C103.5	Summarize the basics of crystals, their structures and different crystal growth techniques

  
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**DEPARTMENT OF HUMANITIES AND SCIENCE  
(B.TECH. INFORMATION TECHNOLOGY )**

**CY8151-Engineering Chemistry[C104]**

C104.1	Water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
C104.2	Gain knowledge on the basics of properties of matter and its applications.
C104.3	Acquire knowledge on the concepts of alloys and phase rule and their applications in compound formation.
C104.4	Gain Knowledge on engineering materials, fuels, energy sources will facilitate future learning.
C104.5	Have adequate knowledge on the concepts of nuclear energy, batteries and their application in energy.

**GE8151-Problem Solving and Python Programming[C105]**

C105.1	Develop algorithmic solutions to simple computational problems.
C105.2	Demonstrate programs using simple Python statements and expressions.
C105.3	Implement control flow and functions concept in Python for solving problems.
C105.4	Use Python data structures – lists, tuples & dictionaries for representing compound data.
C105.5	Use files, exception, modules and packages in Python for solving problems.

**GE8152-Engineering Graphics[C106]**

C106.1	Familiarize with the fundamentals and standards of Engineering drawings and Perform freehand sketching of basic geometrical constructions and multiple views of objects.
C106.2	Draw orthographic projections of lines and plane surfaces.
C106.3	Draw projections of solids
C106.4	Draw projection of sectioned solids and development of surfaces.
C106.5	Visualize and project isometric and perspective sections of simple solids.

**GE8161-Problem Solving And Python Programming Laboratory[C107]**

C107.1	Write, test, and debug simple Python programs
C107.2	Implement Python programs with conditionals and loops.
C107.3	Develop Python programs step-wise by defining functions and calling them.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
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**BS8161-Physics & Chemistry laboratory [C108]**

C108.1	The hands on exercises undergone by the students will help them to apply physics principles of optics.
C108.2	Students will acquire knowledge about the modulus of elasticity and able to apply them in the field.
C108.3	Students will in a position to assess the behaviour of columns, beams and failures of materials

**HS8251-Technical English[C109]**

C109.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, argue using appropriate communicative.
C109.2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
C109.3	Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
C109.4	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
C109.5	Ability to speak/write elaborately on the ideas and opinions relevant in different situations.

**MA8251-Engineering Mathematics-II[C110]**

C110.1	To find eigen values, eigen vectors, canonical form and inverse of a matrix.
C110.2	Estimate vector identities and interpret some integral theorems in a vector field.
C110.3	Estimate vector identities and interpret some integral theorems in a vector field.
C110.4	Apply complex integration to evaluate contour integrals.
C110.5	Examine the concepts of Laplace transformation and solve differential equations with given boundary conditions..

  
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**DEPARTMENT OF HUMANITIES AND SCIENCE**  
**(B.TECH. INFORMATION TECHNOLOGY )**

**PH8252-Physics for Information Science[C111]**

C111.1	Gain knowledge on classical and quantum electron theories, and energy band structures
C111.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices
C111.3	Get knowledge on magnetic properties of materials and their applications in data storage
C111.4	Have the necessary understanding on the functioning of optical materials for optoelectronics
C111.5	Understand the basics of quantum structures and their applications in carbon electronics

**BE8255-Basic Electrical, Electronics and Measurement Engineering[C112]**

C112.1	To discuss the essentials of electric circuits and analysis.
C112.2	To discuss the basic operation of electric machines and transformers.
C112.3	To analyse the introduction of renewable sources and domestic loads.
C112.4	To understand the fundamentals of electronic circuit constructions.
C112.5	To give the introduction to measurement and metering for electric circuits


**IT8201-Information Technology Essentials[C113]**

C113.1	Design and deploy web-sites.
C113.2	Design and deploy simple web-applications.
C113.3	Create simple database applications.
C113.4	Develop information system.
C113.5	Describe the basics of networking and mobile communications.

**CS8251-Programming in C[C114]**

C114.1	Simple applications in C using basic constructs
C114.2	Have a strategy to design and implement applications using arrays and strings
C114.3	Understand and implement applications in C using functions and pointers
C114.4	Knowing Applications in C using structures.
C114.5	Design applications using sequential and random access file processing.

  
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**DEPARTMENT OF HUMANITIES AND SCIENCE  
(B.TECH. INFORMATION TECHNOLOGY )**

**GE8261-Engineering Practices Laboratory[C115]**

C115.1	Study and practice on machine tools and their operations
C115.2	Practice on carpentry tools, components and pipe connections including plumbing work
C115.3	Demonstrate wiring for a simple residential house, identify the ratings of various appliances like Fluorescent tube, incandescent lamp, etc.
C115.4	Calculate the different Electrical quantities, measure the energy consumption using single phase energy meter, measure the resistance to earth of an electrical equipment.
C115.5	Analyse the characteristics of basic electronic devices
C115.6	Elaborate on the components, gates, soldering practices.

**CS8261-Programming in C Lab[C116]**

C116.1	Develop C programs for simple applications making use of basic constructs, arrays and strings.
C116.2	Develop C programs involving functions, recursion, pointers, and structures.
C116.3	Design applications using sequential and random access file processing
C116.4	Develop applications using pointers and function.
C116.5	Develop C programs involving unions.

**IT8211-Information Technology Essentials Laboratory[C117]**

C117.1	Design interactive websites using basic HTML tags, different styles, links and with all Basic control elements.
C117.2	Create client side and server side programs using scripts using PHP.
C117.3	Design dynamic web sites and handle multimedia components

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
(BE MECHANICAL ENGINEERING)

REGULATION – 2017  
COURSE OUTCOMES

## HS8151- Communicative English [C101]

C101.1	Ability to speak/write clearly, confidently, comprehensively and communicate with one or many using appropriate.
C101.2	Ability to read and write cohesively and coherently avoiding grammatical errors ,using a wide range of vocabulary and organizing the ideas logically on a given topic.
C101.3	Interpret different genres of texts adopting various reading strategies and to write comprehensively
C101.4	Ability to listen/view and comprehend different spoken discourses/excerpts different accents and to write clearly in simple language.
C101.5	Ability to speak/write elaborately on the ideas and opinions relevant in different situations

## MA8151- Engineering Mathematics – I [C102]

C102.1	Acquire the knowledge of Limit definition and differentiation rules to differentiate the functions.
C102.2	Examine the concepts of functions of several variables and to find extremum value of a given function
C102.3	Evaluate the integrals by using Riemann sum and Fundamental theorem of Calculus.
C102.4	Develop an ability to trace the curve and find area , volume using multiple integrals.
C102.5	Apply various techniques in solving differential equations.

## PH8151- Engineering Physics [C103]

C103.1	Acquire knowledge on the basics of properties of matter and its applications.
C103.2	Develop knowledge on the concepts of laser and their applications in fibre optics communication.
C103.3	Analyse the concepts of thermal properties of materials and apply them accordingly
C103.4	Incorporate the advanced physics concepts of quantum theory and their applications
C103.5	Summarize the basics of crystals, their structures and different crystal growth techniques.

  
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## GE8161- Problem Solving and Python Programming Laboratory [C107]

C107.1	Write, test, and debug simple Python programs.
C107.2	Implement Python programs with conditionals and loops.
C107.3	Develop Python programs step-wise by defining functions and calling them.

## BS 8161- Physics & Chemistry Laboratory-I [C108]

C108.1	The hands on exercises undergone by the students will help them to apply physics principles of optics. Outfitted with hands on knowledge about pH and conductometric titration
C108.2	Acquire knowledge about the modulus of elasticity and able to apply them in the field The basic concepts on argentometric titration helps in flouride estimation.
C108.3	Assess the behaviour of columns, beams and failures of materials The basic idea on Potentiometric titration will help the adequate knowledge EMF measurement.

## HS8251-Technical English-II [C109]

C109.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, argue using appropriate communicative.
C109.2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
C109.3	Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
C109.4	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings
C109.5	Ability to speak/write elaborately on the ideas and opinions relevant in different situations.

## MA8251- Engineering Mathematics-II [C110]

C110.1	To find eigenvalues, eigenvectors, canonical form and inverse of a matrix.
C110.2	Estimate vector identities and interpret some integral theorems in a vector field.
C110.3	Identify and construct analytic function and application of conformal mapping.
C110.4	Apply complex integration to evaluate contour integrals.
C110.5	Examine the concepts of Laplace transformation and solve differential equations with given boundary conditions.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
(BE MECHANICAL ENGINEERING)

## PH8251-Materials Science [C111]

C111.1	Acquire knowledge about various phase diagrams and their applications.
C111.2	Understand about Fe-Fe <sub>3</sub> C phase diagram, various microstructures of the materials and alloys.
C111.3	Acquire knowledge on the mechanical properties of materials and the various testing methods.
C111.4	Gain knowledge on magnetic, dielectric and superconducting properties of materials and their applications in various fields.
C111.5	Get an insight into the basics of ceramics, composites and nanomaterials and their diverse applications.

## BE8253- Basic Electrical, Electronics and Instrumentation Engineering[C112]

C112.1	Ability to understand the basic theorems used in Electrical circuits.
C112.2	To impart knowledge on Single and three phase circuits and wiring.
C112.3	Ability to Understand working principles of electrical machines
C112.4	To Understand the concepts of various electronic devices
C112.5	Ability to Choose appropriate instruments for electrical measurement for a specific application

## GE 8291-Environmental Science & Engineering [C113]

C113.1	Gain knowledge on flora and fauna in our environment, helps to know about social environment
C113.2	Gain knowledge on the offensive effects of pollution in the day-to-day life.
C113.3	Acquire knowledge on the natural resources available and their conservation.
C113.4	Have adequate knowledge on the concepts of adverse effects of social issues like acid rain and global warming
C113.5	Get knowledge about the Over Population, causes and Effects and the Solutions to overcome the problems due to Population.

  
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DEPARTMENT OF HUMANITIES AND SCIENCE  
(BE MECHANICAL ENGINEERING)

## GE8292-Engineering Mechanics[C114]

C114.1	Illustrate the vectorial and scalar representation of forces and to solve problems with the basic concepts of particle mechanics.
C114.2	Analyse the rigid body under static equilibrium
C114.3	Evaluate the properties of surfaces and solids such as centroid, moment of inertia, centre of gravity and mass moment of inertia
C114.4	Analyse the rigid body under dynamic equilibrium
C114.5	Solve problems involving kinetics of rigid bodies with and without friction

## GE8261-Engineering Practices Laboratory [C115]

C115.1	Study and practice on machine tools and their operations
C115.2	Ability to fabricate carpentry components and pipe connections including plumbing work
C115.3	Demonstrate wiring for a simple residential house, identify the ratings of various appliances like Fluorescent tube, incandescent lamp, etc.
C115.4	Calculate the different Electrical quantities, measure the energy consumption using single phase energy meter, measure the resistance to earth of an electrical equipment.
C115.5	Analyze the characteristics of basic electronic devices.
C115.6	Elaborate on the components, gates, soldering practices.

## BE8261-Basic Electrical, Electronics & Instrumentation Engineering Laboratory[C116]

C116.1	To determine the speed characteristic of different electrical machines
C116.2	To design simple circuits involving diodes and transistors
C116.3	To use operational amplifiers

  
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**DEPARTMENT OF CIVIL ENGINEERING**

**REGULATION – 2017**  
**COURSE OUTCOMES**

**MA6351- Transforms and Partial Differential Equations (C201)**

C201.1	Formulate and solve partial differential equations.
C201.2	Evaluate Fourier series of periodic functions.
C201.3	Apply the method of separation of variables to find the solution of heat and wave equation.
C201.4	Illustrate the Fourier transform techniques.
C201.5	Examine Z transform techniques and solve difference equations.

**CE8301- Strength of Materials I (C202)**

C202.1	Understand the behaviour of different material with its strength, stress, strain and evaluate the deformation of solids with applications to bars, beams and two dimensional state of stress and plane trusses
C202.2	Understand the different types of supports and loading also able to analyze the shear force and bending moment in beams and understand concept of theory of simple bending with the induced stress resultants, deformations and also about flitched beams and leaf springs.
C202.3	Predict sufficient knowledge to evaluate the deflection of beams by different methods and selection of method for determining slope and deflection.
C202.4	Predict the effect of torsion on shafts and springs and apply basic equation of torsion in design of circular shafts and different types of springs.
C202.5	Predict space truss and analyze the pin jointed plane and space frames

**CE8302- Fluid Mechanics (C203)**

C203.1	Gain knowledge about the properties of fluids like specific gravity, weight, volume and fluid statics problems in pressure measurement, forces on plane and buoyancy and flotation.
C203.2	Understand and solve the problems related to equation of motion, continuity equation and Bernoulli's theorem and its application.
C203.3	Gain knowledge about dimensional, model and prototype analysis of hydraulic structures.
C203.4	Solve the losses of flow in pipes by using Darcy and Weisbach equation.
C203.5	Understand the turbulent and boundary layer of flow to find the drag force, displacement, energy and momentum thickness.

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**DEPARTMENT OF CIVIL ENGINEERING**

**CE8351 – Surveying (C204)**

C204.1	Gain knowledge about equipment's used in linear measurement, angular measurement and levelling.
C204.2	Work with theodolite and also understand the concepts of tacheometer to find the height and distance of the object.
C204.3	Understand the concept of different elements of geodetic measurements, control survey methodology and adjust the survey errors using various methods.
C204.4	Conduct astronomical surveying and familiar with methods to determine time, longitude, latitude and azimuth.
C204.5	Understand the concept and principle of modern surveying using advanced instruments total station and GPS.

**CE8391 - Construction Materials (C205)**

C205.1	Understand the properties of most common building materials such as stones, bricks and concrete blocks.
C205.2	Understand the typical and potential applications of lime, cement and aggregates and their properties.
C205.3	Understand the materials used in preparation of concrete and its mix design.
C205.4	Understand the applications of timber and other materials including their properties.
C205.5	Understand the importance of modern material for construction and their properties.

**CE8392 Engineering Geology (C206)**

C206.1	Understand the importance of various geological features, agencies and seismic zones in India.
C206.2	Gain a wide knowledge about the properties of various minerals and rock
C206.3	Gain knowledge about types and properties of rocks, their distribution and uses.
C206.4	Understand structure of folds, faults & joints and geophysical methods of investigation.
C206.5	Understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbour.

  
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**CE8311 Construction Materials Laboratory (C207)**

C207.1	Interpret and test the properties of fine aggregate as a construction material.
C207.2	Interpret and test the properties of coarse aggregate as a construction material.
C207.3	Interpret and test the properties of fresh concrete as a construction material.
C207.4	Interpret and test the properties of hardened concrete as a construction material.
C207.5	Interpret and test the properties of bricks, blocks and tiles as a construction material.

**CE8361 Surveying Laboratory (C208)**

C208.1	Acquired practical knowledge on handling survey instruments like Theodolite, Tachometer and Total station
C208.2	Determine the location of any point horizontally and vertically using Tachometry.
C208.3	Have a basic idea about foundation marking
C208.4	Record the reduced levels using various methods of levelling
C208.5	Possess knowledge about Survey field techniques

**HS8381 Interpersonal Skills / Listening and Speaking (C209)**

C209.1	Ability to listen and respond appropriately.
C209.2	Ability to participate in group discussions.
C209.3	Ability to make effective presentations.
C209.4	Ability to listen/view and comprehend different spoken discourses/excerpts different accents and to speak clearly in simple language.
C209.5	Ability to participate confidently and appropriately in formal and informal conversations.

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**MA8491 Numerical Methods (C210)**

C210.1	Have clear perception of the power of numerical techniques ideas and would be able to demonstrate the applications of these techniques to problems drawn from industry, management and other engineering fields.
C210.2	Gain knowledge of interpolation-forward and backward.
C210.3	Solve problems in differentiation and integration.
C210.4	solve various types of initial value partial differential Equations
C210.5	Solve various types of Seidal method problems.

**CE8401 Construction Techniques and Practices. (C211)**

C211.1	Understand the different construction techniques and structural systems from sub structure to super structure.
C211.2	Understand various techniques and practices such as masonry construction, flooring, and roofing.
C211.3	Know the methods and techniques involved in the construction of various types of substructures.
C211.4	Know the methods and techniques involved in the construction of various types of super structures.
C211.5	Select and understand the knowledge on operation and maintenance of different class of equipment for various engineering applications.

**CE8402 Strength Of Materials II (C212)**

C212.1	The different structural elements and the concept of strain energy methods and compute the deflection of determinate beams, frames and trusses using energy principles.
C212.2	Aanalyse propped cantilever, fixed beams and continuous beams using theorem of three moments equation for external loadings and support settlements.
C212.3	Understand the different end conditions of column and find the load carrying capacity of columns and stresses induced in columns in various methods. The students will also understand the stress action in cylinders and types of failure.
C212.4	Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failue
C212.5	Understand the critical condition of loading and determine the stresses due to unsymmetrical bending of beams, locate the shear centre and to find the stresses in curved beams.

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**CE8403 Applied Hydraulic Engineering. (C213)**

C213.1	Design of open channels of various cross sections including economical channel sections.
C213.2	Compute water profile at different conditions
C213.3	Apply energy concepts to flow in open channel sections, Calculate energy dissipation.
C213.4	Design turbines for the given data, and to know their operation characteristics under different operating conditions.
C213.5	Design pumps for the given data, and to know their operation characteristics under different operating conditions.

**CE8404 Concrete Technology (C214)**

C214.1	Understand the various requirements of cement, aggregates and water for making concrete
C214.2	Gain knowledge about the effect of admixtures on properties of concrete
C214.3	Understand the concept and procedure of mix design as per IS method
C214.4	Gain knowledge about the properties of concrete at fresh and hardened state
C214.5	Understand the importance and application of special concretes

**CE8491 Soil Mechanics (C215)**

C215.1	Understand the classification and composition of the soil, structural arrangements of clay mineralogy, phase relationships in soil and factors affecting field and lab compaction test.
C215.2	Analyse the effective stress with and without capillary rise, permeability of soil based on darcy law with laboratory explanation of constant and variable head, seepage concept on earthen dam and flow net properties with Laplace equations.
C215.3	Evaluate the stress distribution by Boussinesq, Westergaad and Newmark chart, compute the settlement of immediate and primary, Terzaghi one dimensional equation, derivation of square root method and logarithmic time fitting method.
C215.4	Analyse the shear strength of cohesionless and cohesion soil by analytical and graphical method. Computation of shear strength by laboratory methods nad factors influencing shear strength.
C215.5	Remember the infinite slopes and finite slopes, friction circle method, Use of stability number, Guidelines for location of critical slope surface in cohesive, slope protection measures.

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**CE8481 Strength of Materials Laboratory (C216)**

C216.1	Understand tension test on steel rod and compression test on wood.
C216.2	Understand double shear test on metal and torsion test on mild steel rod.
C216.3	Understand Impact test on metal specimen (Izod and Charpy) and Hardness test on metals (Rockwell and Brinell Hardness Tests)
C216.4	Understand Deflection test on metal beam and Compression test on helical spring
C216.5	Understand Deflection test on carriage spring

**CE8461 Hydraulic Engineering Laboratory (C217)**

C217.1	Compare and interpret the knowledge of theorems and principles in hydraulic engineering.
C217.2	Detect the measurement of flow in pipes and determine the friction and minor losses.
C217.3	Gain knowledge and assess the characteristics of pumps such as discharge and power efficiency.
C217.4	Gain knowledge and assess the characteristics of turbines discharge and power efficiency.
C217.5	Understand the concept of metacentre and determine the metacentric height of a floating object.

**HS8461 Advanced Reading and Writing (C218)**

C218.1	Function effectively as an individual in multi-disciplinary settings.
C218.2	Able to comprehend and write effective reports.
C218.3	Write different types of essays by understanding the elements and structure of a good essay.
C218.4	Write winning job application and project report, statement of purpose and apply these in their career.
C218.5	Read and evaluate texts critically and display critical thinking in various professional contexts.

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**CE8501 Design of Reinforced Cement Concrete Elements (C301)**

C301.1	Understand the type of loadings and various design methods for the design of RC elements and also able to classify the section for rectangular beams.
C301.2	Analysis and design of flanged beams by limit state method and design of beams for shear, bond and torsion.
C301.3	Understand the types of loads acting on the slab and also design the various types of slabs and staircase by limit state method.
C301.4	Design columns for axial, uniaxial and biaxial eccentric loadings.
C301.5	Understand the safe bearing capacity of soil and Design the footing by limit state method

**CE8502 Structural Analysis I (C302)**

C302.1	Understand strain energy method and able to analyze continuous beams, pin-jointed indeterminate plane frames, rigid plane frames by strain energy method.
C302.2	Predict sway and non-sway frames and can be able to analyze the continuous beams and rigid frames by slope deflection method.
C302.3	Understand moment distribution method and will be able to analyze continuous beams and rigid frames with and without sway using moment distribution method.
C302.4	Predict about flexibility method and will be able to analyze the indeterminate pin jointed plane frames, continuous beams and rigid frames by using matrix flexibility method.
C302.5	Predict about stiffness method and will be able to analyze continuous beams, pin jointed trusses and rigid plane frames by using stiffness matrix methods.

**EN8491 Water supply Engineering (C303)**

C303.1	Understanding of water quality criteria and standards and their relation to public health.
C303.2	Have an insight into the structure of drinking water supply systems, including water transport, treatment and distribution.
C303.3	Have the ability to design various functional units in treatment system
C303.4	Know the detailed treatment systems involved in treating water including advanced treatment units
C303.5	Gain the ability to design and evaluate water supply distribution systems and their alternatives on basis of chosen selection criteria.

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**CE8591 Foundation Engineering (C304)**

C304.1	Understand the site investigations, methods and sampling with respect to foundation buildings.
C304.2	Get knowledge on bearing capacity and testing methods to find safe bearing capacity of soil based on field investigation and laboratory tests.
C304.3	Know how to design types of footings based on loads on structure and bearing capacity of soil and seismic force.
C304.4	Get knowledge how to determine the load carrying capacity and settlement of pile foundation based on field investigation and soil properties.
C304.5	Gain knowledge on earth pressure analysis and stability analysis of retaining walls.

**GE8071 Disaster Management (C305)**

C305.1	Differentiate the types of disasters, causes and their impact on environment and society
C305.2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.
C305.3	Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.
C305.4	Gain knowledge on Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster
C305.5	Gain knowledge on Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

**OAI551 Environment and Agriculture (C306)**

C306.1	Gain knowledge on the issues of with respect to land use and land scape changes. Students able to gain the knowledge about water quality, globalization and agro eco system.
C306.2	Understand the environmental impacts with respect to erosion and deposition problems in irrigation and mechanized agriculture etc.
C306.3	Gain knowledge on the basic concepts of Climate Change, Water scarcity and water shortage.
C306.4	Understand the ecosystem, ecological diversity, farming principles and forest fragmentation.
C306.5	Understand the alternate culture systems, Mega farms and vertical farms , Agricultural environment policies and its impacts

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**CE8511 Soil Mechanics Laboratory (C307)**

C307.1	Identify and classify soil based on standard geotechnical engineering practice.
C307.2	Determine index properties of the soil and its behaviour
C307.3	Capable of performing laboratory compaction and in place density tests for fill quality control.
C307.4	Gain knowledge of site specific field investigations including collection of soil samples for testing and observation of soil behaviour/ building damage.
C307.5	Determine engineering properties such as shear strength, compressibility and permeability by conducting appropriate tests.

**CE8512 Water and Waste Water Analysis Lab. (C308)**

C308.1	Calibrate and determine the pH, turbidity, conductivity and hardness of the wastewater by using electrode and titration method.
C308.2	Understand and determine the alkalinity, acidity, chloride, available and residual chlorine and coagulation present in the wastewater by using titration method and jar test apparatus.
C308.3	Calibrate and determine the phosphates, sulphates, iron and fluoride present in the waste water sample by using spectrophotometry method.
C308.4	Determine the oil and grease, suspended, volatile and fixed solids present in the waste water sample using vacuum pump and hot air oven.
C308.5	Understand and determine the dissolved oxygen, biological and chemical oxygen demand, microscopic examination, SVI and MPN index present in the waste water using BOD and COD digester, microscope and bacteria culture test.

**CE8513 Survey Camp (C309)**

C309.1	Gain a thorough knowledge of preparation of contours in different terrains
C309.2	Gain a good idea of calculation of earthwork excavation.
C309.3	Apply a variety of techniques about computing large areas
C309.4	Well versed with the concept of astronomical surveying
C309.5	Capable of drawing the features of different elements along the proposal road

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**CE8604 Highway Engineering (C313)**

C313.1	Understand the history of road development, cross section of road, classification of roads and factors influencing highway alignment.
C313.2	Design and analyse the geometrical curves of types of horizontal and vertical, concept of super elevation, transition curves and gradients.
C313.3	Understand the pavement components and design consideration of flexible and rigid pavements as per IRS guidelines.
C313.4	Remember the properties and testing of highway materials, Quality control measures and highway drainage.
C313.5	Evaluate the pavement, maintenance of pavement, roughness, present serviceability index and skid resistance.

**EN8592 Waste Water Engineering. (C314)**

C314.1	Estimate sewage generation and design sewer system including sewage pumping stations and gain required understanding on the characteristics and composition of sewage.
C314.2	Perform basic design of the unit operations and processes, understand the primary treatment of sewage and methods of treatment process based on the specific composition of sewage.
C314.3	Understand the secondary process of sewage treatment and methods of selection of treatment process based on the specific composition of sewage.
C314.4	Understand the standard methods for disposal of sewage and self-purification of streams
C314.5	Gain knowledge on sludge treatment, disposal and understand the products which are recoverable from sludge treatment process.

**CE8005 Air Pollution and Control Engineering (C315)**

C315.1	Understand the nature, characteristics and basic concepts of air pollutants.
C315.2	Design stacks and to study the plume characteristics in relation to atmosphere
C315.3	Design and evaluate air pollutant control equipment for particulate contaminants
C315.4	Design and evaluate air pollutant control equipment for gaseous contaminants
C315.5	Identify, formulate and solve air and noise pollution problems

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### CE8601 Design of Steel Structural Elements (C310)

C310.1	Understand the concepts of various design philosophies
C310.2	Design common bolted and welded connections for steel structures
C310.3	Design tension members and understand the effect of shear lag.
C310.4	Understand the design concept of axially loaded columns and column base connections
C310.5	Understand specific problems related to the design of laterally restrained and unrestrained steel beams.

### CE8602 Structural Analysis II. (C311)

C311.1	Understand about the moving load, influence lines and able to analyse determinate structures for moving loads
C311.2	Identify indeterminate structures and analyse indeterminate structures for moving loads
C311.3	Understand about the arches in structural forms and can able to analyse the arches.
C311.4	Predict cables and able to analyze the cables, suspension bridge
C311.5	Understand Upper and lower bound theorems and will be able to perform plastic analysis of indeterminate beams and frames.

### CE8603 Irrigation Engineering (C312)

C312.1	Understand and evaluate the crop water requirements.
C312.2	Understand the methods and management of irrigation.
C312.3	Design the Impounding structures like gravity dam, earth dam and arch dam.
C312.4	Understand the canal irrigation including canal regulators, canal drop, canal outlet and canal lining.
C312.5	Understand the water management on optimization of water use, participatory irrigation management.

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**CE8611 Highway Engineering Laboratory. (C316)**

C316.1	Understand the test on the aggregates like specific gravity, los Angeles abrasion test and water absorption of aggregates.
C316.2	Understand specific gravity of bitumen and penetration test.
C316.3	Understand viscosity test and softening point test and ductility test.
C316.4	Understand stripping test and determination of binder content and Marshall stability and flow values of bituminous mixes.
C316.5	Understand field testing equipment like skid resistance tester / Benkelbeam etc.

**CE8612 Irrigation and Environmental Engineering Drawing (C317)**

C317.1	Gain knowledge in the design principles and drawing of tank components and impounding structures.
C317.2	Gain knowledge in the design principles and drawing of cross drainage works and canal regulation structures.
C317.3	Design the applications of environmental engineering drawings like municipal water treatment plants.
C317.4	Design the applications of environmental engineering drawings like sewage treatment plants.

**HS8581 - Professional Communication – (C318)**

C318.1	To enhance the students to make effective presentations.
C318.2	To help the students participate confidently in Group Discussions.
C318.3	To motivate and prepare the students to attend job interviews and be successful in their pursuit.
C318.4	To train and develop the adequate Soft Skills required for the workplace.
C318.5	Ability to interpret different genres of texts, infer implied meanings and evaluate it for ideas as well as for methods of presentation relevant in different situations.

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**CE8701 Estimation, Costing and Valuation Engineering (C401)**

C401.1	Prepare and articulate the estimation of quantities for various engineering structures.
C401.2	Organize the schedules and cost estimates for a construction project through codes and computer software.
C401.3	Prepare and articulate the specifications, reports and tender documents for a construction project.
C401.4	Understand and review the framework required to legally establish different types of contracts among stakeholders.
C401.5	Calculate the types of valuation required to assess engineering structures.

**CE8702 Railways, Airports, Docks and Harbour Engineering (C402)**

C402.1	Understand the elements of permanent way such as rails, sleepers, Ballast, rail fixtures and fastenings, selection of gauges, track stress, coning of wheels, creep in rails, defects in rails and to create the route alignment surveys, conventional and modern methods of geometric design of railway, gradient, super elevation, widening of gauge on curves and level crossings
C402.2	Evaluate the earthwork and stabilization of track on poor soil, track drainage, calculation of materials required for track laying, construction and maintenance of tracks in railway station and yards and passenger amenities, signalling.
C402.3	Remember the Air transport characteristics, airport classification of ICAO- airport planning and site selection of typical Airport layouts, case studies, parking and circulation area.
C402.4	Create the runway design orientation, Wind Rose Diagram, problems on basic and actual length, geometric design such as elements of taxiway design. Airport zones, passenger facilities and services like runway and taxiway markings.
C402.5	Remember the definition of basic terms of harbour, design of harbours, harbour layout and terminal facilities, coastal structures: Piers, breakwaters, wharves, jetties, Quays, spring fenders, dolphins and floating landing stage like Inland water transport and wave action on coastal Structures and coastal protection works, coastal regulation zone, 2011

**CE8703 Structural Design & Drawing (C403)**

C403.1	Design and draw reinforced concrete cantilever and counterfort type retaining walls.
C403.2	Understand the design and draw flat slab as per code provisions
C403.3	Understand the design and draw reinforced concrete and steel bridges
C403.4	Design and draw reinforced concrete and steel tanks.
C403.5	Design the various steel trusses and gantry girders.

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**EN8591 Municipal Solid Waste Management. (C404)**

C404.1	Understand the nature and characteristics of municipal solid wastes
C404.2	Understand the regulatory requirements regarding municipal solid waste management
C404.3	Plan waste minimisation and design storage, collection and transport
C404.4	Understand off site processing and equipments
C404.5	Understand disposal techniques of municipal solid waste

**OML751 Testing of Materials (C405)**

C405.1	The students will be able to understand the importance of material testing, Testing organizations, committee and standards.
C405.2	Students should be able to identify suitable testing technique to inspect industrial component.
C405.3	Students will be able to know the non-destructive testing methods.
C405.4	Students able to get knowledge in the material characterization testing.
C405.5	Students should know the ability to use the different technique and know its applications and limitations.

**CE8711 Creative and Innovative Project. (C406)**

C406.1	Come up with designs, fabrication or algorithms and programs expressing their ideas in a novel way.
C406.2	Develop a methodology to achieve the objectives..
C406.3	Demonstrate the novelty of the project through the results and outputs.

**CE8712 Industrial Training (C407)**

C407.1	Have a firsthand knowledge of practical problems in carrying out engineering tasks.
C407.2	Understand the problem solving methods in the field.
C407.3	Learn the text book knowledge in the field.

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**GE8076 Professional Ethics in Engineering (C408)**

C408.1	Gain awareness on human values for professional excellence and stress management
C408.2	Gain knowledge on engineering ethics, moral issues & uses of ethical theories
C408.3	Understand the role of engineers as responsible experimenters along with courses of ethics in engineering field .
C408.4	Gain awareness of responsibilities of an engineer for safety and risk along with risk benefit analysis
C408.5	Acquire knowledge on global issues and able to apply ethical principles to resolve situations that arise in their professional lives

**CE8022 Prefabricated Structures. (C409)**

C409.1	Gain knowledge about design principles, layout of factory and stages of loading in precast of different elements and precast construction.
C409.2	Acquire knowledge about panel systems, slabs, connection used in precast construction and they will be in a position to design the elements.
C409.3	Gain knowledge about types of floor systems, stairs and roofs used in precast construction.
C409.4	Predict the types of walls used in precast construction, sealants, design of joints.
C409.5	Gain knowledge in behaviour of structural elements during abnormal loadings.

**CE8811 Project Work (C410)**

C410.1	Take up challenging practical problems and solve problems by formulating proper methodologies
C410.2	Gain knowledge of the civil engineering field and gain knowledge and be up to date with the latest technology.
C410.3	Find solutions for complex civil engineering problems.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

REGULATION-2017  
COURSE OUTCOMES

**MA8351 - Discrete Mathematics - [C201]**

C201.1	Make use of propositions, predicates and flow of logical proofs.
C201.2	Acquire knowledge on induction and counting principles and to solve recurrence relation.
C201.3	Perceive the knowledge of various types and characteristics of graphs.
C201.4	Interpret concepts and properties of groups, rings and fields.
C201.5	Comprehends the ideas of lattices and Boolean algebra.


**CS8351 - Digital Principles And System Design - [C202]**

C202.1	To understand different methods used for the simplification of Boolean functions.
C202.2	To understand and design a system that uses combinational logic for the given specification; Simulate combinational logic systems using verilog or VHDL.
C202.3	To understand and design synchronous sequential system for the given specification; Simulate sequential logic systems using verilog or VHDL.
C202.4	To design and implement Asynchronous sequential system for the given specification.
C202.5	To design and implement memory accessing systems and systems using PLA, PAL.

**CS8391 - Data Structures - [C203]**

C203.1	Implement abstract data types for linear data structures – List.
C203.2	Implement and apply the different linear data structures to problem solutions.
C203.3	Implement and apply the non-linear data structure Tree ADT to problem solutions.
C203.4	Implement and apply the non-linear data structure Graph ADT to problem solutions.
C203.5	Critically analyse the various sorting algorithms.

  
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**CS8392 - Object Oriented Programming - [C204 ]**

C204.1	Develop Java programs using OOP principles.
C204.2	Develop Java programs with the concepts inheritance and interfaces.
C204.3	Build Java applications using exceptions and I/O streams.
C204.4	Develop Java applications with threads and generics classes.
C204.5	Develop interactive Java programs using AWT, Swings components with event handling.

**EC8395 - Communication Engineering - [C205]**

C205.1	Design AM communication systems.
C205.2	To use data and pulse communication techniques.
C205.3	Apply digital communication techniques.
C205.4	Analyze Source and Error control coding.
C205.5	An in- depth knowledge of Spread Spectrum and Multiple Access Techniques.

**CS8381 - Data Structures Lab – [C206]**

C206.1	Write functions to implement linear and non-linear data structure operations.
C206.2	Suggest appropriate linear / non-linear data structure operations for solving a given Problem.
C206.3	Appropriately use the linear / non-linear data structure operations for a given problem.
C206.4	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.

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**CS8383 - Object Oriented Programming Laboratory – [C207]**

C207.1	Develop and implement Java programs for simple applications that make use of classes.
C207.2	Develop and implement Java programs for simple applications that make use of packages and interfaces.
C207.3	Develop and implement Java programs with array list, exception handling and multithreading.
C207.4	Design applications using file processing, generic programming.
C207.5	Design applications using AWT components and event handling.

**EC8382 - Digital Systems Lab – [C208]**

C208.1	Implement simplified combinational circuits using basic logic gates.
C208.2	Implement combinational circuits using MSI devices.
C208.3	Implement sequential circuits like registers and counters.
C208.4	Simulate combinational and sequential circuits using HDL.

**HS8381 - Interpersonal Skills/Listening & Speaking – [C209]**

C209.1	Ability to listen and respond appropriately.
C209.2	Ability to participate in group discussions.
C209.3	Ability to make effective presentations.
C209.4	Ability to listen/view and comprehend different spoken discourses/excerpts different accents and to speak clearly in simple language.
C209.5	Ability to participate confidently and appropriately in formal and informal conversations.

  
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**MA8402 - Probability and Queueing Theory – [C210]**

C210.1	To understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions.
C210.2	To understand the basic concepts of one and two dimensional random variables and determine correlation, regression.
C210.3	Classify the concept of random processes and to demonstrate the specific applications to Poisson and Markov Processes.
C210.4	Examine the specific applications of queueing models.
C210.5	Illustrate the network's ideas and series queues.

**CS8491 - Computer Architecture – [C211]**

C211.1	Understand the basics structure of computers, operations and instructions.
C211.2	Design arithmetic and logic unit.
C211.3	Understand pipelined execution and design control unit.
C211.4	Understand parallel processing architectures.
C211.5	Understand the various memory systems and I/O communication.

**CS8492 - Database Management Systems – [C212]**

C212.1	Classify the modern and futuristic database applications based on size and complexity.
C212.2	Map ER model to Relational model to perform database design effectively.
C212.3	Write queries using normalization criteria and optimize queries.
C212.4	Compare and contrast various indexing strategies in different database systems.
C212.5	Appraise how advanced databases differ from traditional databases.

  
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**CS8451 - Design and Analysis of Algorithms – [C213]**

C213.1	Analyze the complexity of algorithms for various computing problems.
C213.2	Design and analyse solutions to problems based on Brute Force and Divide and Conquer approaches.
C213.3	Design and analyse solutions to problems based on dynamic programming and greedy approach.
C213.4	Design and analyse solutions to problems based on iterative improvement method.
C213.5	Modify existing algorithms to improve efficiency.

**CS8493 - Operating Systems – [C214]**

C214.1	Explain the basic concepts .functions of Operating Systems and system calls.
C214.2	Outline various threading models, process synchronization, Compare the performance of various CPU scheduling algorithms and deadlocks.
C214.3	Compare and contrast various memory management schemes.
C214.4	Explain I/O management and file systems.
C214.5	Perform administrative tasks on Linux Servers, Compare iOS and Android Operating Systems.

**CS8494 - Software Engineering – [C215]**

C215.1	Explain the software process and agile development.
C215.2	Demonstrate the software requirements and analysis.
C215.3	Apply the software design procedure.
C215.4	Compare and contrast various the various software testing and implementation Techniques.
C215.5	Estimate the software project cost and effort.

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**CS8481 - Database Management Systems Laboratory – [C216]**

C216.1	Use typical data definitions and manipulation commands.
C216.2	Design applications to test Nested and Join Queries.
C216.3	Implement simple applications that use Views.
C216.4	Implement applications that require a Front-end Tool.
C216.5	Critically analyze the use of Tables, Views, Functions and Procedures.

**CS8461 - Operating Systems laboratory – [C217]**

C217.1	Learn Unix commands and shell programming
C217.2	Implement various CPU Scheduling Algorithms
C217.3	Implement Process Creation and Inter Process Communication.
C217.4	Implement Deadlock Avoidance and Deadlock Detection Algorithms
C217.5	Implement Page Replacement Algorithms and File Organization , File Allocation Strategies

**HS8461 Advanced Reading and Writing - [C218]**

C218.1	Function effectively as an individual in multi-disciplinary settings.
C218.2	Able to comprehend and write effective reports.
C218.3	Write different types of essays by understanding the elements and structure of a good essay.
C218.4	Write winning job application and project report, statement of purpose and apply these in their career.
C218.5	Read and evaluate texts critically and display critical thinking in various professional contexts.



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**MA8551 - Algebra and Number Theory – [C301]**

C301.1	Apply the basic notations of groups, rings, field which will be used to solve the related problems.
C301.2	Understand the fundamental concepts of advanced algebra in modern mathematics.
C301.3	Apply the basic knowledge of advanced algebraic techniques in number theory
C301.4	Apply to solve the non-trivial problems related to the concepts and by proving the simple theorem.
C301.5	Apply integrated approach to number theory and abstract algebra.

**CS8591 - Computer Networks – [C302]**

C302.1	Understand the basic layers and its functions in computer networks and evaluate the performance of the network
C302.2	Understand the basics of how data flows from one node to another
C302.3	Analyze and design routing algorithms.
C302.4	Design protocols for various functions in the network.
C302.5	Understand the working of various application layer protocols

**EC8691 - Microprocessors and Microcontrollers – [C303]**

C303.1	Understand architecture of 8086 and Design and implement programs on 8086 microprocessor.
C303.2	Understand signals, system bus architecture of 8086 and multiprocessor configuration.
C303.3	Design and implement interfacing of I/O circuits with 8086 microprocessor
C303.4	Understand architecture of 8051 microcontroller.
C303.5	Understand architecture of 8051, Design and implement programs on 8051 microcontroller.

  
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**CS8501 - Theory of Computation – [C304]**

C304.1	Construct automata, regular expression for any pattern.
C304.2	Write Context free grammar for any construct.
C304.3	Design Turing machines for any language.
C304.4	Propose computation solutions using Turing machines.
C304.5	Derive whether a problem is decidable or not.

**CS8592 - Object Oriented Analysis and Design – [C305]**

C305.1	Understand the fundamentals of object modelling and unified process.
C305.2	Design software systems with static UML diagrams.
C305.3	Design software systems using UML dynamic and implementation diagrams.
C305.4	Transform UML based software design into pattern based design using design patterns
C305.5	Understand the various testing methodologies for OO software.

**OCE551 - Air Pollution and Control Engineering – [C306]**

C306.1	Identify the sources of air pollution with its effects and ambient air quality standards & emission.
C306.2	Understanding the concept of lapse rates, Atmospheric stability, Plume rise and various other parameters on meteorology.
C306.3	Understanding the role of Gravity separators, Centrifugal separator, Fabric filters and ESP.
C306.4	Understanding the role of adsorption, absorption, condensation and incineration techniques.
C306.5	Ability to ensure quality control and preventive measures.

**OCE552 - Geographic Information System – [C306]**

C306.1	Have basic idea about the fundamentals of GIS.
C306.2	Understand the types of data models.
C306.3	Get knowledge about data input and topology.
C306.4	Gain knowledge on data quality and standards.
C306.5	Understand data management functions and data output

  
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**EC8681 - Microprocessor and Microcontroller Lab – [C307]**

C307.1	Write ALP for arithmetic and logical operations.
C307.2	Interface different I/O's with processor.
C307.3	Generate waveforms using Microprocessors.
C307.4	Execute programs in 8051.
C307.5	Familiar with 8086 and 8051 Simulators.

**CS8582 - Object Oriented Analysis and Design Lab – [C308]**

C308.1	Perform OO analysis and design for a given problem specification.
C308.2	Identify and map basic software requirements in UML mapping.
C308.3	Improve the software quality using design patterns and to explain the rationale behind applying specific design patterns.
C308.4	Test the compliance of the software with the SRS.

**CS8581 - Networks Lab – [C309]**

C309.1	Implement various protocols using TCP and UDP.
C309.2	Compare the performance of different transport layer protocols.
C309.3	Use simulation tools to analyze the performance of various network protocols.
C309.4	Analyze various routing algorithms.
C309.5	Implement error correction codes.

**CS8651 - Internet Programming – [C310]**

C310.1	Construct a basic website using HTML and Cascading Style Sheets.
C310.2	Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.
C310.3	Develop server side programs using Servlets and JSP.
C310.4	Construct simple web pages in PHP and to represent data in XML format.
C310.5	Use AJAX and web services to develop interactive web applications.

  
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**CS8691 - Artificial Intelligence – [C311]**

C311.1	Use appropriate search algorithms for any AI problem.
C311.2	Represent a problem using first order and predicate logic.
C311.3	Provide the apt agent strategy to solve a given problem.
C311.4	Design software agents to solve a problem.
C311.5	Design applications for NLP that use Artificial Intelligence.

**CS8601 - Mobile Computing – [C312]**

C312.1	To understand the basic concepts of mobile computing.
C312.2	To learn the basics of mobile telecommunication system.
C312.3	To be familiar with the network layer protocols and Ad-Hoc networks.
C312.4	To know the basis of transport and application layer protocols.
C312.5	To gain knowledge about different mobile platforms and application development.

**CS8602 - Compiler Design – [C313]**

C313.1	Design lexical analyzer for a sample language.
C313.2	Apply different parsing algorithms to develop the parsers for a given grammar.
C313.3	Understand syntax-directed translation and generate intermediate code.
C313.4	Understand run-time environment and design simple code generator.
C313.5	Apply code optimization techniques.

**CS8603 - Distributed System – [C314]**

C314.1	Elucidate the foundations and issues of distributed systems.
C314.2	Understand the various synchronization issues and global state for distributed systems.
C314.3	Understand the Mutual Exclusion and Deadlock Detection algorithms in distributed systems.
C314.4	Describe the agreement protocols and fault tolerance mechanisms in distributed systems.
C314.5	Describe the features of peer-to-peer and distributed shared memory systems.

  
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**IT8076 - Software Testing – [C315]**

C315.1	Outline the software testing criteria for developing test cases.
C315.2	Build the test cases for software development.
C315.3	Understand the various level of testing.
C315.4	Discuss about the test metrics, measurements and management process.
C315.5	Illustrate the needs of software test automation and make use of the latest test tool for Testing.

**CS8661 - Internet Programming Laboratory – [C316]**

C316.1	Construct Web pages using HTML/XML and style sheets.
C316.2	Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms.
C316.3	Develop dynamic web pages using server side scripting.
C316.4	Use PHP programming to develop web applications.
C316.5	Construct web applications using AJAX and web services.

**CS8662 - Mobile Application Development Laboratory – [C317]**

C317.1	To understand the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
C317.2	To understand how to work with various mobile application development frameworks
C317.3	To learn the basic and important design concepts and issues of development of mobile applications.
C317.4	To understand the capabilities and limitations of mobile devices.
C317.5	To understand the components and structure of mobile application development frameworks for Android and windows OS based mobiles

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**CS8611 - Mini Project – [C318]**

C318.1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology <ul style="list-style-type: none"><li>· Review the literature and develop solutions for framed problem statement.</li><li>· Implement hardware and/or software techniques for identified problems.</li><li>· Test and analyses the modules of planned project.</li><li>· Write technical report and deliver presentation.</li><li>· Apply engineering and management principles to achieve project goal.</li></ul>
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**HS8581 – Professional Communication – [C319]**

C319.1	To enhance the students to make effective presentations.
C319.2	To help the students participate confidently in Group Discussions.
C319.3	To motivate and prepare the students to attend job interviews and be successful in their pursuit.
C319.4	To train and develop the adequate Soft Skills required for the workplace.
C319.5	Ability to interpret different genres of texts, infer implied meanings and evaluate it for ideas as well as for methods of presentation relevant in different situations.

**MG8591 - Principles of Management – [C401]**

C401.1	Define management and its evolution.
C401.2	Summarize the functions of planning.
C401.3	Summarize the functions of organising.
C401.4	Classify the various directing techniques.
C401.5	Identify the various control techniques.



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**CS8792 - Cryptography and Network Security – [C402]**

C402.1	Understand the fundamentals of networks security, security architecture, threats and vulnerabilities
C402.2	Apply the different cryptographic operations of symmetric cryptographic algorithms
C402.3	Apply the different cryptographic operations of public key cryptography
C402.4	Apply the various Authentication schemes to simulate different applications.
C402.5	Understand various Security practices and System security standards

**CS8791 - Cloud Computing [C403]**

C403.1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing
C403.2	Learn the key and enabling technologies that help in the development of cloud
C403.3	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
C403.4	Explain the core issues of cloud computing such as resource management and security. .
C403.5	Be able to install and use current cloud technologies.

**OCY751 - Waste Water Treatment – [C404]**

C404.1	Understand the physical, chemical and biological parameters of water and water quality requirement. Gain the knowledge about preliminary treatment
C404.2	Gain the knowledge about filtration , lime soda, zeolite and demineralization processes and – industrial water treatment for boilers.
C404.3	Understand the conventional treatment methods like adsorption , activated carbon treatment , iron and manganese removal ,aeration, oxidation, ion exchange.
C404.4	Gain the knowledge on wastewater treatment pre and primary treatment, equalization neutralization – screening and grid removal – sedimentation – oil separation gas stripping of volatile organics
C404.5	Will have knowledge about adsorption and oxidation process



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**GE8077 - Total Quality Management – [C405]**

C405.1	To select and apply appropriate techniques in identifying customer needs, as well as the quality impact that will be used as inputs in TQM methodologies
C405.2	Have a strategy to create and maintain a quality culture that will move the organization towards world-class status
C405.3	Understand the TQM concept and techniques for managing, controlling and improving quality at the workplace
C405.4	Knowing business excellence models and be able to assess organizations performance through data collection and analysis
C405.5	Have a strategy to implement total quality practices at the workplace and effect savings on the input cost of an organization

**GE 8071 - Disaster Management – [C406]**

C406.1	Understand and Differentiate the types of disasters, causes and their impact on environment and society.
C406.2	Analyse various methods of risk reduction measures as well as mitigation and assess the Vulnerability.
C406.3	Understand and examine the hazard and vulnerability profile of India.
C406.4	Value the Disaster damage assessment and recognize how to manage the Disaster.
C406.5	Construct ideas for the various disaster Scenarios in the Society.

**CS8711 - Cloud Computing Lab [C407]**

C407.1	Configure various virtualization tools such as Virtual Box, VMware workstation.
C407.2	Design and deploy a web application in a PaaS environment.
C407.3	Learn how to simulate a cloud environment to implement new schedulers.
C407.4	Install and use a generic cloud environment that can be used as a private cloud.
C407.5	Manipulate large data sets in a parallel environment.

**IT8761 - Security Laboratory – [C408]**

C408.1	Develop code for classical Encryption Techniques to solve the problems.
C408.2	Build cryptosystems by applying symmetric and public key encryption algorithms
C408.3	Construct code for authentication algorithms
C408.4	Develop a signature scheme using Digital signature standard
C408.5	Demonstrate the network security system using open source tools

  
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**GE8076 - Professional Ethics in Engineering [C409]**

C409.1	The students be aware on human values for professional excellence and stress management.
C409.2	The students gain knowledge on engineering ethics, moral issues & uses of ethical theories.
C409.3	The students understand the role of engineers as responsible experimenters along with courses of ethics in engineering field .
C409.4	The students will be aware of responsibilities of an engineer for safety and risks along with risk benefit analysis.
C409.5	The students will acquire knowledge on global issues and able to apply ethical principles to resolve situations that arise in their professional lives.

**CS8078 - Green Computing – [C410]**

C410.1	To understand the concepts of technologies that conform to low-power computation.
C410.2	To understand green (power-efficient) technologies for components of one single computer, such as CPU, memory and disk, and appreciate cutting edge designs for these components.
C410.3	To have a basic understanding of a variety of technologies applied in building a green system and to identify the various key sustainability and green IT trends.
C410.4	To discuss the various laws, standards and protocols for regulating green IT.
C410.5	Be able to use a range of tools to help monitor and design green systems.

**CS8811 - Project Work - [C411]**

C411.1	<p>On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.</p> <ul style="list-style-type: none"><li>• Review the literature and develop solutions for framed problem statement.</li><li>• Implement hardware and/or software techniques for identified problems.</li><li>• Test and analyse the modules of planned project.</li><li>• Write technical report and deliver presentation.</li><li>• Apply engineering and management principles to achieve project goal.</li></ul>
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

## REGULATION – 2017 COURSE OUTCOMES

### MA8352 - Linear Algebra and Partial Differential Equations [C201]

C201.1	Interpret the basic notions of groups, rings, fields and Vector Space which will then be used to solve related problems
C201.2	Identify the concepts of vector space, linear transformations and diagonalization..
C201.3	Classify and apply the concept of inner product spaces in orthogonalization processes
C201.4	Evaluate the procedure to solve partial differential equations
C201.5	Examine and Able to solve the engineering problems using Fourier series.

### EC8393 - Fundamentals of Data Structures in C [C202]

C202.1	Implement Linear and Non-Linear data structure operations using C
C202.2	Suggest appropriate linear/non-linear data structure for any given data set
C202.3	Apply hashing concepts for a given problem
C202.4	Modify or suggest new data structure for an application
C202.5	Appropriately choose the sorting algorithm for an application

### EC8351 - Electronic Circuits – I [C203]

C203.1	Understand the basic concept of biasing and design biasing for various types of amplifiers
C203.2	Design and analyse single stage and multistage BJT amplifiers
C203.3	Design and analyse single stage and multistage FET amplifiers
C203.4	Analyse the frequency response of BJT and MOSFET amplifiers
C203.5	Design, troubleshoot and fault analysis the regulated DC power supplies



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### EC8352 - Signals and Systems [C204]

C204.1	Analyze & classify Continuous and Discrete time signals and to identify LTI systems
C204.2	Derive the Fourier series for continuous time signals and analyze the Fourier transform and Laplace transform of different signals
C204.3	Analyze the output response of the Continuous Time systems by performing convolution and realize the continuous Time Systems
C204.4	Analyze the Discrete Time Fourier Transform and Z transform of Discrete Time signals & Understand the sampling theorem and to convert the analog signal to discrete signal
C204.5	Analyze the output response of the Discrete Time systems by performing convolution and realize the Discrete Time Systems

### EC8392 - Digital Electronics [C205]

C205.1	Simplify Boolean functions using Kmap and quine Mclasky
C205.2	Design and analyze combinational circuits
C205.3	Design and analyze Synchronous sequential circuits
C205.4	Design and Analyze Asynchronous Sequential Circuits
C205.5	Implement designs using programmable logic devices and digital integrated circuits

### EC8391 - Control Systems Engineering [C206]

C206.1	Understand the methods of representation of systems and getting their transfer function models for analysis of physical systems and to introduce the control system components
C206.2	Get adequate knowledge in the time response of systems and steady state error analysis and to introduce the effects of controllers
C206.3	Obtain basic knowledge in obtaining the open loop and closed loop frequency responses of systems and to study the design of compensators
C206.4	Understand the concept of stability of control system and methods of stability analysis
C206.5	Understand the state space model of a physical system and the concepts of sampled data control system.

  
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### EC8381 - Fundamentals of Data Structures in C Laboratory [C207]

C207.1	Write basic and advanced programs in C
C207.2	Implement functions and recursive functions in C
C207.3	Implement data structures using C
C207.4	Choose appropriate sorting algorithm for an application and implement it in a modularized way

### EC8361 - Analog and Digital Circuits Laboratory [C208]

C208.1	Design regulated power supplies
C208.2	Design regulated power supplies
C208.3	Simulate amplifier using SPICE
C208.4	Design and implement combinational circuits.
C208.5	Design and implement sequential circuits.

### HS8381 - Interpersonal Skills/Listening&Speaking [C209]

C209.1	Ability to listen and respond appropriately
C209.2	Ability to participate in group discussions.
C209.3	Ability to make effective presentation.
C209.4	Ability to listen/view and comprehend different spoken discourses/excerpts different accents and to speak clearly in simple language.
C209.5	Ability to participate confidently and appropriately in formal and informal conversations.

  
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### MA8451 - Probability and Random Processes [C210]

C210.1	Interpret the axiomatic formulation of Probability theory and random variables as an intrinsic need for the analysis of random phenomena
C210.2	Identify probability models, function of random variables based on one & two dimensional random variables and determine regression.
C210.3	Classify the concept of random processes and to demonstrate the specific applications to Poisson and Markov Processes.
C210.4	Evaluate correlation and spectral density of stationary random processes.
C210.5	Examine the idea of linear time invariant system.

### EC8452 - Electronic Circuits II [C211]

C211.1	To understand the concepts and design of feedback amplifiers.
C211.2	To understand the basic concepts, design and analyze RC, LC and crystal oscillators.
C211.3	To understand the performance of tuned amplifiers.
C211.4	To understand the concepts of clipper, clamper, comparator circuits and multivibrators.
C211.5	To understand the concepts power amplifiers and DC convertors.

### EC8491 - Communication Theory [C212]

C212.1	Design AM communication systems
C212.2	Design Angle modulated communication systems
C212.3	Apply the concepts of Random Process to the design of Communication systems
C212.4	Analyze the noise performance of AM and FM systems
C212.5	Gain Knowledge in sampling and quantization

  
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### EC8451 - Electromagnetic Fields [C213]

C213.1	Able to understand the concepts of vector calculus and vector coordinate systems
C213.2	Able to understand the behaviour of static electric field and the concept of conductors and dielectrics in static electric fields.
C213.3	Able to understand the behaviour of magnetic circuits and magnetic material
C213.4	To analyse Maxwell's equation in differential and integral form
C213.5	Able to analyse the propagation of EM waves in lossy and lossless media.

### EC8453 - Linear Integrated Circuits [C214]

C214.1	To understand the basic building blocks of linear integrated circuits
C214.2	To understand the linear and non-linear applications of operational amplifiers
C214.3	To understand the concepts and applications of analog multipliers and PLL
C214.4	To understand the concepts of ADC and DAC using Op-Amps
C214.5	To understand the concepts of waveform generation and introduce some special function ICs

### GE8291 - Environmental Science and Engineering [C215]

C215.1	The knowledge gained on flora and fauna in our environment helps to know about social environment.
C215.2	The students will gain knowledge on the offensive effects of pollution in the day-to-day life.
C215.3	The students will acquire knowledge on the natural resources available and their conservation.
C215.4	The students will have adequate knowledge on the concepts of adverse effects of social issues like acid rain and global warming.
C215.5	The students will get knowledge about the problems faced by the society due to population explosion.

  
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### EC8461 - Circuits Design and Simulation Laboratory [C216]

C216.1	Analyze various types of feedback amplifiers
C216.2	Design oscillators and tuned amplifiers.
C216.3	Demonstrate the various types of multivibrators.
C216.4	Simulate Oscillators, tuned amplifiers, wave-shaping circuits and multivibrators using SPICE Tool.
C216.5	Analyze various types of power amplifiers.

### EC8462 - Linear Integrated Circuits Lab [C217]

C217.1	To understand the basics of linear integrated circuits and available ICs
C217.2	To understand the characteristics of the operational amplifier
C217.3	To apply operational amplifiers in linear and nonlinear applications
C217.4	To acquire the basic knowledge of special function IC.
C217.5	To use SPICE software for circuit design

### EC8501 - Digital Communication [C301]

C301.1	To Design PCM systems
C301.2	To Design and implement base band transmission schemes
C301.3	To Design and implement band pass signalling schemes
C301.4	To Analyze the spectral characteristics of band pass signalling schemes and their noise performance
C301.5	To Design error control coding schemes

  
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### EC8553 - Discrete Time Signal Processing [C302]

C302.1	Apply DFT for the analysis of digital signals and systems
C302.2	Design IIR filters
C302.3	Design FIR filters and Characterize finite word length effects on filters
C302.4	Analyse Finite word length effect
C302.5	Study the architecture, addressing modes and programming of DSP processor

### EC8552 - Computer Architecture and Organization [C303]

C303.1	Describe Data representation, instruction formats and the operation of a digital computer
C303.2	Illustrate the fixed point and floating-point arithmetic for ALU operation
C303.3	Discuss about implementation schemes of control unit and pipeline performance.
C303.4	Explain the concept of various memories, interfacing and organization of multiple processors
C303.5	Discuss parallel processing technique and unconventional architectures.

### EC8551 - Communication Networks [C304]

C304.1	Able to explain the components requirement of networks and link layer service.
C304.2	Able to classify the Media Access Control Protocols and different Internetworking.
C304.3	Able to Demonstrate various types of routing techniques.
C304.4	Able to outline the mechanisms involved in transport layer.
C304.5	Able to experiment with different application layer protocols.

  
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### EC8073 – Medical Electronics [C305 A]

C305.1	Discuss the terminologies of electro-physiological and recording of bio-potential.
C305.2	Comprehend the measurement techniques of bio-chemical and non-electrical parameters.
C305.3	Interpret the various types of assist devices.
C305.4	Comprehend the various diathermy and bio-telemetry techniques.
C305.5	Outline current trends in medical instrumentation.

### EC8074 – Robotics & Automation [C305 B]

C305.1	Identify components, advantages, disadvantages, applications of robots and review the history of robotic evolution.
C305.2	Understand actuators and sensors for measurement of parameters used in robot manipulator.
C305.3	Solve direct and inverse kinematics of simple robot manipulators.
C305.4	Develop mathematical equations related to robot kinematics, dynamics and path planning.
C305.5	Understand the impact and progress in AI and other research trends in the field of robotics

### OIT552 – Cloud Computing [C306 A]

C306.1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing
C306.2	Learn the key and enabling technologies that help in the development of cloud
C306.3	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
C306.4	Explain the core issues of cloud computing such as resource management and security
C306.5	Be able to install and use current cloud technologies and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud

  
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## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### EC8562 - Digital Signal Processing Laboratory [C307]

C307.1	To implement Linear and Circular Convolution
C307.2	To implement FFT and IFFT algorithms
C307.3	To implement FIR and IIR filters
C307.4	To study the architecture of DSP processor
C307.5	To demonstrate Finite word length effect effect

### EC8561 - Communication Systems Laboratory [C308]

C308.1	Simulate and validate the various functional modules of a communication system
C308.2	Demonstrate their knowledge in baseband signaling schemes through implementation of digital modulation schemes
C308.3	Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of communication system
C308.4	Simulate end to end communication link

### EC8563 - Communication Networks Laboratory [C309]

C309.1	Communicate between two desktop computers
C309.2	Implement the different flow control protocols
C309.3	Write program using sockets
C309.4	Implement and compare various routing algorithms
C309.5	Use the network simulation tool

  
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### EC8691 - Microprocessors and Microcontrollers [C310]

C310.1	Understand architecture of 8086 and Design and implement programs on 8086 microprocessor.
C310.2	Understand signals, system bus architecture of 8086 and multiprocessor configuration.
C310.3	Design and implement interfacing of I/O circuits with 8086 microprocessor
C310.4	Understand architecture of 8051 microcontroller.
C310.5	Understand architecture of 8051 , Design and implement programs on 8051 microcontroller.

### EC8095 - VLSI Design [C311]

C311.1	Realize the concepts of digital building blocks using MOS transistor.
C311.2	Design combinational MOS circuits and power strategies.
C311.3	Design and construct Sequential Circuits and Timing systems.
C311.4	Design arithmetic building blocks and memory subsystems.
C311.5	Apply and implement FPGA design flow and testing.

### EC8652 - Wireless Communication [C312]

C312.1	Able to Characterize a wireless channel and evolve the system design specifications
C312.2	Able to Design a cellular system based on resource availability and traffic demands.
C312.3	Able to Identify suitable signalling and multipath mitigation techniques for the wireless channel and system under consideration
C312.4	Able to understand the concepts of diversity in channels.
C312.5	Able to understand the concepts of fading and non- fading channels

  
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### MG8591 - Principles of Management [C313]

C313.1	Understand the managerial functions like planning, organizing, staffing, leading & controlling
C313.2	The basic knowledge on international aspect of management
C313.3	The basic knowledge on management and its evolution
C313.4	A knowledge on budgetary control and their strategies
C313.5	A understanding of the motivational theories existing in the management

### EC8651 - Transmission Lines and RF Systems [C314]

C314.1	Discuss the signal propagation through transmission lines.
C314.2	Discuss the difference between low frequency transmission and propagation at Radio Frequencies.
C314.3	Analyse impedance matching techniques using stubs.
C314.4	Analyse the various modes of propagation of wave guides and cavity resonators.
C314.5	Analyse the various functions of different RF systems and stability considerations of RF systems.

### EC8004 – Wireless Networks [C315]

C315.1	Able to understand the architecture, protocol stack and services offered by Wireless Local Area Networks.
C315.2	Able to understand the basics of mobile IP networks, mechanism behind packet delivery and various routing protocols of MANETs.
C315.3	Able to understand the architecture of UMTS, protocol layers and various services offered by 3G networks.
C315.4	Able to understand the internetworking architecture of WLANS & WWANS.
C315.5	Able to understand the motivation behind 4G evolution and various technologies developed for 4G networks.

  
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### EC8681 – Microprocessors and Microcontrollers Laboratory [C316]


C316.1	Write ALP for arithmetic and logical operations
C316.2	Interface different I/O's with processor
C316.3	Generate waveforms using Microprocessors
C316.4	Execute programs in 8051
C316.5	Familiar with 8086 and 8051 Simulators.

### EC8661 – VLSI Design Laboratory [C317]

C317.1	Write HDL code for basic as well as advanced digital integrated circuit
C317.2	Import the logic modules into FPGA Boards
C317.3	Design, Simulate and Extract the layouts of Digital & Analog IC Blocks using EDA tools

### EC8611 – Technical Seminar [C318]

C318.1	Identify the domain specific engineering problem for presentation.
C318.2	Prepare the document with proper work plan.
C318.3	Compare and analyze the emerging technology.
C318.4	Show the presentation skill in front of the audience.
C318.5	Discuss with the peer members.

  
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### HS8581 – Professional Communication [C319]

C319.1	Enhance the students to make effective presentations.
C319.2	Help the students participate confidently in Group Discussions.
C319.3	Motivate and prepare the students to attend job interviews and be successful in their pursuit.
C319.4	Train and develop the adequate Soft Skills required for the workplace.
C319.5	Interpret different genres of texts, infer implied meanings and evaluate it for ideas as well as for methods of presentation relevant in different situations.

### EC8701 – Antennas & Microwave Engineering [C401]

C401.1	Apply the basic principles and evaluate antenna parameters and link power budgets
C401.2	Design and assess the performance of various antennas
C401.3	Analyse Antenna Array and its different mode of operation
C401.4	Analyse various operation of microwave passive devices and microwave generators
C401.5	Design a microwave system given the application specifications

### EC8751 – Optical Communication [C402]

C402.1	Realize basic elements in optical fibers, different modes and configurations.
C402.2	Analyze the transmission characteristics associated with dispersion and polarization techniques
C402.3	Design optical sources and detectors with their use in optical communication system.
C402.4	Construct fiber optic receiver systems, measurements and coupling techniques.
C402.5	Design optical communication systems and its networks.



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### EC8791 – Embedded and Real Time Systems [C403]

C403.1	Interpret the concepts of embedded system design and analysis.
C403.2	Describe the architecture and programming of ARM Processor.
C403.3	Analyze the performance and optimization techniques of embedded programming components.
C403.4	Explain the basic concepts of Real Time System for Embedded system design
C403.5	Evaluate the Real time operating system performance and power optimization strategies for embedded system process.

### EC8702 – Ad hoc and Wireless Sensor Networks [C404]

C404.1	Explain the various protocols of Adhoc networks
C404.2	Describe the Architecture of Wireless Sensor Network.
C404.3	Describe the Wireless Sensor Network concepts and protocol.
C404.4	Discuss about the Network Security in Sensor based network.
C404.5	Discuss about the Wireless Sensor Network software tools.

### GE8071 – Disaster Management

C405.1	Differentiate the types of disasters, causes and their impact on environment and society
C405.2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.
C405.3	Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.
C405.4	Gain knowledge on Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster
C405.5	Gain knowledge on Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

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### OME754 – Industrial Safety [C406A]

C406A.1	Identify the various possible hazards in different fields of engineering
C406A.2	Classify various hazards based on their nature and severity
C406A.3	Apply the principles for maintaining safety, occupational health and hygiene in an industry
C406A.4	Examine the factors that lead to an accident
C406A.5	Plan the safety measures appropriate for an industry.

### OCS751 – Data Structures & Algorithms [C406A]

C406B.1	Understand the various algorithm design and analysis techniques and Implement various linear data structures operations and applications using List ADT.
C406B.2	Implement and apply the linear data structures stack and queue to problem solutions.
C406B.3	Illustrate and compare various techniques for searching and sorting.
C406B.4	Represent and manipulate data using nonlinear data structure tree to design algorithms for various applications.
C406B.5	Implement and apply the nonlinear data structure Graph ADT to problem solutions using dynamic programming and greedy approach.

### OCS752 – Introduction to C Programming [C406B]

C406C.1	Develop executable C programs with decision making and looping statements, which illustrate the use of various operators.
C406C.2	Write executable C programs which process the data that are stored in an array.
C406C.3	Create executable C programs to process strings and use pointers for array processing and parameter passing
C406C.4	Divide a given computational problem into a number of modules called functions and develop multi-function C program by using recursion if required, to solve the computational problem.
C406C.5	Develop executable C programs with structure for storing the data to be processed

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## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### EC8711 – Embedded Laboratory [C407]

C407.1	Understand the Building Blocks of ARM CORTEX M4 Embedded Kit.
C407.2	Write programs in ARM for a specific Application
C407.3	Interface A/D and D/A convertors with ARM system
C407.4	Write program for interfacing motor and sensor.
C407.5	Write program for interfacing keypad and LCD.

### EC8761 - Advanced Communication Laboratory [C408]

C408.1	Analyze the performance of simple optical link by measurement of losses and analyzing the mode characteristics of fiber
C408.2	Analyze the Eye Pattern, Pulse broadening of optical fiber and the impact on BER
C408.3	Estimate the Wireless Channel Characteristics and analyze the performance of Wireless
C408.4	Understand the characteristics of Microwave Sources
C408.5	Understand the Characteristics in Microwave System design

### GE8076 - Professional Ethics in Engineering [C409]

C409.1	Gain awareness on human values for professional excellence and stress management
C409.2	Gain knowledge on engineering ethics, moral issues & uses of ethical theories
C409.3	Understand the role of engineers as responsible experimenters along with courses of ethics in engineering field .
C409.4	Gain awareness of responsibilities of an engineer for safety and risc along with risc benefit analysis
C409.5	Acquire knowledge on global issues and able to apply ethical principles to resolve situations that arise in their professional lives

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## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### EC8094 – Satellite Communication [C410A]

C410A.1	Analyze the satellite orbit
C410A.2	Analyze the earth segment and space segment
C410A.3	Analyze the various methods of satellite access
C410A.4	Analyze the satellite Link design
C410A.5	Design various satellite applications

### IT8006- Principles of Speech Processing [C410]

C410.1	Understand the Fundamentals of speech production
C410.2	To understand the speech compression techniques
C410.3	To understand the speech recognition techniques
C410.4	Deal with the issues in speech recognition
C410.5	Explain the concept of Text-to-Speech Synthesis

### EC8811- Project Work [C411]

C411.1	Apply the fundamental knowledge and skills in engineering and effectively formulate a project.
C411.2	Plan and manage the time effectively as a team.
C411.3	Orally present and demonstrate the product to peers, academics, general and industry community.
C411.4	Consider the business context and commercial positioning of designed devices or systems
C411.5	Explore the knowledge for the 'real world' situations that a professional engineer can encounter

  
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

## COURSE OUTCOMES:2017 REGULATION

### MA8353 -Transforms and Partial Differential Equations

<b>C201.1</b>	To Formulate and solve partial differential equations.
<b>C201.2</b>	To Evaluate Fourier series of periodic functions.
<b>C201.3</b>	Apply the method of separation of variables to find the solution of heat and wave equation.
<b>C201.4</b>	Illustrate the Fourier transform techniques.
<b>C201.5</b>	Examine Z transform techniques and solve difference equations.

### EE8351 Digital Logic Circuits

<b>C202.1</b>	To study various number systems and simplify the logical expressions using Boolean functions
<b>C202.2</b>	To study combinational circuits
<b>C202.3</b>	To design various synchronous and asynchronous circuits
<b>C202.4</b>	To introduce asynchronous sequential circuits and PLDs
<b>C202.5</b>	To introduce digital simulation for development of application oriented logic circuits

  
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## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

### EE8391 Electromagnetic Theory


<b>C203.1</b>	Explain the different coordinate systems, and apply Gauss's law
<b>C203.2</b>	Interpret the concepts of Electrostatic fields and apply boundary conditions on electrostatic fields
<b>C203.3</b>	Develop concepts of Magnetostatic fields and apply boundary conditions.
<b>C203.4</b>	Analyze the Maxwell's equations for electromagnetic fields
<b>C203.5</b>	Derive Electromagnetic wave equation and apply the Poynting expression.

### EE8301 Electrical Machines - I

<b>C204.1</b>	Able to analyze the magnetic circuits & Calculate the induced EMF and understand the properties of magnetic materials.
<b>C204.2</b>	Able to understand the working of Transformer and analyze the operation of transformer indifferent loading condition
<b>C204.3</b>	Able to understand & analyze the concept of field energy and co-energy in single and multiple excited systems
<b>C204.4</b>	Understand the construction of D.C machines and operation of DC Generator
<b>C204.5</b>	Understand the operation of DC motor, Starting and speed control of DC motor, analyze the characteristics of dc motor & the braking system

### EC8353 Electron Devices and Circuits

<b>C205.1</b>	Explain the structure and characteristics of various types of Diodes, design half and full wave Rectifiers.
<b>C205.2</b>	Understand the different configurations of BJT, MOSFET,UJT and draw its characteristics.
<b>C205.3</b>	Analyse the characteristics of amplifier gain and frequency response.
<b>C205.4</b>	Analyse the concepts of different modes of differential amplifier, tuned amplifier and power amplifier
<b>C205.5</b>	Develop the parameters of feedback amplifier circuit, describe different types of oscillator circuits.

  
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

## ME8792 Power Plant Engineering


<b>C206.1</b>	Explain the layout, construction and working of the components inside a thermal power plant.
<b>C206.2</b>	Explain the layout , construction and working of the components inside a diesel gas and combined cycle power plants.
<b>C206.3</b>	Explain the layout, construction and working of the components inside nuclear power plant.
<b>C206.4</b>	Explain the layout, construction and working of the components inside renewable energy power plants.
<b>C206.5</b>	Explain the application of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.

## EC8311 Electronics Laboratory

<b>C207.1</b>	To observe the characteristics of electronic devices such as diodes,transistors etc
<b>C207.2</b>	Measure voltage,frequency and phase of any waveform using CRO. Generate sine, square and triangular waveforms with required frequency and amplitude using function generator
<b>C207.3</b>	To analyse the characterisitics of common emitter amplifier and rc phase shift oscillator

## EE8311 Electrical Machines Laboratory - I

<b>C208.1</b>	Ability to understand and analyze DC Generator
<b>C208.2</b>	Ability to understand and analyze DC Motor
<b>C208.3</b>	Ability to understand and analyse Transformers.

  
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## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

### MA8491 Numerical Methods

<b>C209.1</b>	Have clear perception of the power of numerical techniques ideas and would be able to demonstrate the applications of these techniques to problems drawn from industry, management and other engineering fields.
<b>C209.2</b>	Gain knowledge of interpolation-forward and backward.
<b>C209.3</b>	Solve problems in differentiation and integration.
<b>C209.4</b>	solve various types of initial value partial differential Equations
<b>C209.5</b>	Solve various types of Seidal method problems.

### EE8401 Electrical Machines - II

<b>C210.1</b>	Ability to understand the construction, working principle and performance of Synchronous Generator
<b>C210.2</b>	Ability to acquire knowledge on Synchronous Motor
<b>C210.3</b>	Ability to understand the construction and working principle of three phase Induction Motor
<b>C210.4</b>	Ability to acquire knowledge on starting and speed control mechanisms on three phase Induction Motor
<b>C210.5</b>	Ability to understand the construction and working principle of Special Machines

### EE8402 Transmission and Distribution

<b>C211.1</b>	To understand the importance and the functioning of transmission line parameters.
<b>C211.2</b>	To acquire knowledge on the modelling and performance of transmission lines.
<b>C211.3</b>	To understand the concept of Lines and Insulators
<b>C211.4</b>	To acquire knowledge on underground cables.
<b>C211.5</b>	To understand the importance of distribution systems of the electric power in power system

  
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## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

### EE8403 Measurements and Instrumentation

<b>C212.1</b>	To impart knowledge on basic functional elements of instrumentation, the factors affecting performance of measuring system and different measuring instruments to measure current and voltage.
<b>C212.2</b>	To understand the operating principles of various types of electrical instruments to measure different electrical quantities.
<b>C212.3</b>	To understand the working principle of various comparative methods in measurement techniques.
<b>C212.4</b>	To understand the working principle of various storage and display devices.
<b>C212.5</b>	To understand the concepts various transducers and the data acquisition systems.

### EE8451 Linear Integrated Circuits and Applications

<b>C213.1</b>	Analyze the basic planar processes to fabricate the monolithic IC and Summarize the fabrication of active and passive components of ICs.
<b>C213.2</b>	Design the basic applications of op-amp and also analyze the characteristics of op-amp.
<b>C213.3</b>	Design the signal analysis using op-amp based circuits like filters, comparators, multivibrators, waveform generators, converters and instrumentation amplifier.
<b>C213.4</b>	Analyze the functional blocks and applications of special IC's like 555 Timer, 565-PLL, IC 566- VCO and AD633-Analog multiplier ICs.
<b>C213.5</b>	Analyze the functional blocks and applications of AD623, LM78XX, LM79XX, LM317, 723, SMPS and ICL8038.

### IC8451 Control Systems

<b>C214.1</b>	To understand the use of transfer function models for analysis physical systems and introduce the control system components.
<b>C214.2</b>	To provide adequate knowledge in the time response of systems, understanding P,PI& PID controllers and to construct root locus for a system.
<b>C214.3</b>	To accord basic knowledge in obtaining the open loop and closed-loop frequency responses of systems using plotting techniques like bode plot and polar plot.
<b>C214.4</b>	To assess stability of a system using RH and nyquist stability criterion and to design compensators.
<b>C214.5</b>	To deduce state variable representation of physical systems and to inspect controllability and observability.

  
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## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

### EE8411 Electrical Machines Laboratory - II

<b>C215.1</b>	Ability to understand and analyze EMF and MMF methods
<b>C215.2</b>	Ability to understand the importance of Synchronous machines and analyze the characteristics of V and Inverted V curves
<b>C215.3</b>	Ability to understand the importance of Induction Machines and acquire knowledge on separation of losses

### EE8461 Linear and Digital Integrated Circuits Laboratory

<b>C216.1</b>	Apply Boolean functions to implement adder, subtractor circuits and convert Excess 3 to BCD, Binary to Gray code and vice versa
<b>C216.2</b>	Test Parity generator and checker and Design encoder decoder circuits ,Demonstrate 4 bit synchronous, asynchronous counter and Shift registers.
<b>C216.3</b>	5 Apply OP-AMP to construct Adder, comparator, differentiator, Integrator and describe VCO, PLL characteristics.

### EE8412 Technical Seminar

<b>C217.1</b>	Function effectively as an individual and Make effective presentation on Engineering/ technology
<b>C217.2</b>	Review, prepare and present technological developments in the field of electrical and electronics engineering.
<b>C217.3</b>	Design documentation and write effective reports on seminar topics

### EE8501 Power System Analysis

<b>C301.1</b>	Develop the per unit mathematical model of the power system and bus admittance and impedance matrices.
<b>C301.2</b>	To derive the power flow equation and apply numerical methods to solve the power flow problem using Gauss seidal and Newton Raphson method.
<b>C301.3</b>	To model and analyse the power system under symmetrical fault conditions.
<b>C301.4</b>	To model and analyse the power system under various unsymmetrical fault conditions.
<b>C301.5</b>	To model and analyse the transient behaviour of power system when it is subjected to a disturbance.

  
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## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

### EE8551 Microprocessors and Microcontrollers

<b>C302.1</b>	Ability to acquire knowledge in Architecture, Memory organization and Interrupts in 8085.
<b>C302.2</b>	Ability to understand the Instruction set, Data Transfer and Programming in 8085
<b>C302.3</b>	Ability to acquire knowledge in Architecture, Memory organization and Interrupts in 8051
<b>C302.4</b>	Ability to understand the importance of interfacing in 8085 & 8051
<b>C302.5</b>	Ability to write assembly language programmes in 8051 and design 8051 based applications

### EE8552 Power Electronics

<b>C303.1</b>	Describe the static characteristics of various power semiconductor devices and acquire knowledge in driver and protection circuits.
<b>C303.2</b>	Compare the operation of various types of controlled rectifiers and implement the converters for real time applications.
<b>C303.3</b>	Realize the basics topologies of DC-DC switching regulators and acquire knowledge in real time applications and simulation skills.
<b>C303.4</b>	Describe the principle of operation of various Inverters and distinguish the different types of PWM techniques in harmonic reduction and understand real time applications.
<b>C303.5</b>	Explain the working principle of various AC- AC converters and control strategies and to choose converters for real time applications.

### EE8591 Digital Signal Processing

<b>C304.1</b>	To classify the different types of signals and systems and explain the sampling process of continuous time signal.
<b>C304.2</b>	To apply z-transform and inverse Z transform and analyze discrete time systems.
<b>C304.3</b>	To apply Radix -2 Decimation in Time (DIT) and Decimation in Frequency (DIF)FFT Algorithm to Compute Discrete Fourier Transform
<b>C304.4</b>	To design Infinite Impulse Response (IIR) filters and Finite Impulse Response (FIR) filters.
<b>C304.5</b>	To explain various architectures of Digital signal processors

  
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

## CS8392 Object Oriented Programming

<b>C305.1</b>	Outline OOP principles such as objects, classes, encapsulation, inheritance and polymorphism and associate those principles in java language.
<b>C305.2</b>	Design algorithms and develop programs using the concept of Inheritance and Interfaces.
<b>C305.3</b>	Examine the exception handling concepts and develop I/O streams for reading and writing files
<b>C305.4</b>	Develop programs that run in the same instant using multithreading and multitasking concepts and utilize the power of generic programming in java for robust programming.
<b>C305.5</b>	Design and develop applications in java using forms, AWT, and swing.

## OAN551 SENSORS & TRANSDUCERS

<b>C306.1</b>	To acquire expertise in various calibration techniques and signal types for sensors
<b>C306.2</b>	To acquire knowledge in motion, proximity and ranging sensors in various applications
<b>C306.3</b>	To acquire knowledge in force, magnetic and heading sensors in various applications
<b>C306.4</b>	To acquire knowledge in optical, pressure, temperature and smart sensors in various applications
<b>C306.5</b>	To acquire knowledge in DAQ systems with different sensors for real time applications

## EE8511 Control and Instrumentation Laboratory

<b>C307.1</b>	Analyze the characteristics of P, PI and PID controllers experimentally and analyze the stability of the control system using MATLAB
<b>C307.2</b>	Compute the transfer function of a Field controlled DC motor experimentally and analyze the response of Lag, Lead and Lag-Lead Compensators
<b>C307.3</b>	Analyze the transient response of Position Control system experimentally and analyze the Characteristics of Synchro-Transmitter- Receiver and to Use MATLAB for the Simulation of Control Systems.
<b>C307.4</b>	Ability to analyze the basic concepts of bridge networks and to analyze the Dynamics of Sensors/Transducers
<b>C307.5</b>	Measure the Power and Energy experimentally and analyze signal conditioning circuits and to Use MATLAB for Process Simulation

  
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## HS8581 Professional Communication

<b>C308.1</b>	To enhance the students to make effective presentations.
<b>C308.2</b>	To help the students participate confidently in Group Discussions.
<b>C308.3</b>	To motivate and prepare the students to attend job interviews and be successful in their pursuit.
<b>C308.4</b>	To train and develop the adequate Soft Skills required for the workplace.
<b>C308.5</b>	Ability to interpret different genres of texts, infer implied meanings and evaluate it for ideas as well as for methods of presentation relevant in different situations.

## CS8383 Object Oriented Programming Laboratory

<b>C309.1</b>	Design C++ programs using functions, classes with objects, member functions and constructors.
<b>C309.2</b>	Develop operator and function overloading and run time polymorphism using C++.
<b>C309.3</b>	Develop file handling techniques in C++ for sequential and random access also use Java code for strings.
<b>C309.4</b>	Construct packages and interfaces in Java.
<b>C309.5</b>	Create threads in Java and handle predefined and user defined exceptions.

## EE8601 Solid State Drives

<b>C310.1</b>	Analyze the Classification of the various types of drives and load torque characteristics and Apply the multi quadrant dynamics in hoist load system.
<b>C310.2</b>	Analyze the operation of steady state analysis of single phase and three phase fully controlled converter and Chopper fed separately excited dc motor drives and discuss the various control strategies of converter.
<b>C310.3</b>	Analyze the operation and characteristics of various methods of solid state speed control of induction motor.
<b>C310.4</b>	Analyze the operation of various modes of V/f control of synchronous motor drives and different types of permanent magnet synchronous motor drives.
<b>C310.5</b>	Analyze and design a current and speed controller and develop the transfer function for DC motor, load and converter, closed loop control with current and speed feedback.

*M. K. S.*  
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*J. S.*  
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

## EE8602 Protection and Switchgear

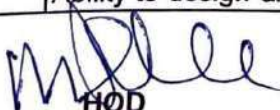
<b>C311.1</b>	Ability to find the causes of abnormal operating conditions of the power system and acquire the knowledge on Methods of Grounding
<b>C311.2</b>	Ability to understand and analyze Electromagnetic relay characteristics
<b>C311.3</b>	Ability to study about the apparatus protection
<b>C311.4</b>	Ability to study about the static and numerical relays
<b>C311.5</b>	Ability to acquire knowledge on functioning of circuit breaker and suggest suitability circuit breaker

## EE8691 Embedded Systems

<b>C312.1</b>	Ability to understand and analyze Embedded systems.
<b>C312.2</b>	Ability to suggest an embedded system for a given application.
<b>C312.3</b>	Ability to operate various Embedded Development Strategies
<b>C312.4</b>	Ability to acquire knowledge on various processor scheduling algorithms.
<b>C312.5</b>	Ability to understand basics of Real time operating system.

## EE8002 DESIGN OF ELECTRICAL MACHINES

<b>C313.1</b>	Ability to understand basics of design considerations for rotating and static electrical Machines and ability to design of field system and armature for its application.
<b>C313.2</b>	Ability to design single phase and three phase transformer.
<b>C313.3</b>	Ability to design armature and field of DC machines.
<b>C313.4</b>	Ability to design stator and rotor of induction motor.
<b>C313.5</b>	Ability to design and analyze synchronous machines.

  
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

## EC8395 COMMUNICATION ENGINEERING

<b>C314.1</b>	Describe the concepts of analog modulation systems
<b>C314.2</b>	Illustrate pulse communication techniques
<b>C314.3</b>	Summarize the concepts of digital modulation systems.
<b>C314.4</b>	Implement the source coding techniques.
<b>C314.5</b>	Explain the basic principles in the generation of spread spectrum signals and multiple access in communication systems

## EE8661 Power Electronics and Drives Laboratory

<b>C315.1</b>	Develop schemes for generation of firing pulses suitable for the power switches in converter circuits.
<b>C315.2</b>	Evaluate the performance of powerconverter circuits
<b>C315.3</b>	Experience the platform for simulation of power electronic circuits

## EE8681 Microprocessors and Microcontrollers Laboratory

<b>C316.1</b>	Ability to acquire knowledge in Addressing modes & instruction set of 8085 & 8051.
<b>C316.2</b>	Ability to need & use of Interrupt structure 8085 & 8051.
<b>C316.3</b>	Ability to understand the importance of Interfacing

## EE8611 Mini Project

<b>C317.1</b>	Apply practical knowledge within the chosen area of expertise for project development
<b>C317.2</b>	Identify, analyze, design and handle prototype projects with a complete and organized approach
<b>C317.3</b>	Contribute as an individual or in a team in development of technical projects
<b>C317.4</b>	Develop effective communication skills for presentation of project related activities and prepare mini project reports and examination

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## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

### EE8701 High Voltage Engineering

<b>C401.1</b>	Apply the knowledge of Engineering fundamentals to identify the causes of different over voltages in Electrical Power System and select the protection system according to the types of over voltages.
<b>C401.2</b>	Identify the factors that leads the breakdown mechanism of different dielectric materials and Compare dielectric strength of the different dielectric materials (Gas, Oil, Vacuum and solid)
<b>C401.3</b>	Apply the knowledge of Engineering fundamentals to identify the generating circuits to produce different high voltages and High currents.
<b>C401.4</b>	Apply the knowledge of Engineering fundamentals to identify the measuring instrument to measure the different over voltages and currents in Electrical Power System.
<b>C401.5</b>	Analyse the testing of different Electrical power apparatus and the insulation coordination.

### EE8702 Power System Operation and Control

<b>C402.1</b>	Ability to understand the day-to-day operation of electric power system and to analyze the control actions to be implemented on the system to meet the minute-to-minute variation of system demand.
<b>C402.2</b>	Ability to acquire knowledge on real power-frequency interaction and To model power-frequency dynamics and to design power-frequency controller.
<b>C402.3</b>	Ability to understand the reactive power-voltage interaction and To model reactive power-voltage interaction and the control actions to be implemented for maintaining the voltage profile against varying system load.
<b>C402.4</b>	Ability to understand the significance of power system operation and control and To study the economic operation of power system.
<b>C402.5</b>	Ability to understand the various systems available and design SCADA and its application for real time operation.

### EE8703 Renewable Energy Systems

<b>C403.1</b>	Analyze the challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the environment.
<b>C403.2</b>	Formulate the power in wind energy, classify the types of WPPs, select the site for WPPs and analyze the grid integration issues of WPPs.
<b>C403.3</b>	Apply the knowledge of engineering for harnessing thermal and electrical energy from solar energy
<b>C403.4</b>	Apply the knowledge of engineering for harnessing electrical energy from biomass, geothermal and hydro power energy.
<b>C403.5</b>	Apply the knowledge of engineering for harnessing electrical energy from ocean energy, fuel cell, hybrid energy systems and production with storage of the hydrogen.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

## OCS752 Introduction of computer programming

<b>C404.1</b>	Develop executable C programs with decision making and looping statements, which illustrate the use of various operators.
<b>C404.2</b>	Write executable C programs which process the data that are stored in an array.
<b>C404.3</b>	Create executable C programs to process strings and use pointers for array processing and parameter passing
<b>C404.4</b>	Divide a given computational problem into a number of modules called functions and develop multi-function C program by using recursion if required, to solve the computational problem.
<b>C404.5</b>	Develop executable C programs with structure for storing the data to be processed

## GE8071 Disaster Management

<b>C405.1</b>	Differentiate the types of disasters, causes and their impact on environment and society
<b>C405.2</b>	Assess vulnerability and various methods of risk reduction measures as well as mitigation.
<b>C405.3</b>	Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.
<b>C405.4</b>	Gain knowledge on Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster
<b>C405.5</b>	Gain knowledge on Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

## EE8010 Power Systems Transients

<b>C406.1</b>	Explain the concept of transients and Compute the solution of transient current equation for RL and RLC system.
<b>C406.2</b>	Illustrate the importance of switching transients; Explain the concept of resistance switching, load switching and capacitance switching.
<b>C406.3</b>	Explain the concept of lightning mechanism, Describe the interaction between lightning and power system
<b>C406.4</b>	Apply the concept of reflection and refraction, Draw the Bewley Lattice diagram for different systems.
<b>C406.5</b>	Explain the concept of transients and Compute the solution of transient current equation for RL and RLC system.

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## EE8711 Power System Simulation Laboratory

<b>C407.1</b>	Ability to understand power system planning and operational studies.
<b>C407.2</b>	Ability to acquire knowledge on Formation of Bus Admittance and Impedance Matrices and Solution of Networks
<b>C407.3</b>	Ability to analyze the power flow using GS and NR method and to find Symmetric and Unsymmetrical fault
<b>C407.4</b>	Ability to understand the economic dispatch and to analyze the electromagnetic transients.

## EE8712 Renewable Energy Systems Laboratory

<b>C408.1</b>	Analyze the V-I characteristics and efficiency of 1 KW solar PV system with stand alone and grid connected by conducting experiment and simulation using MATLAB Simulink.
<b>C408.2</b>	Analyze the performance and assessment of micro wind energy generator, solar-wind hybrid system and various types of intelligent controller for hybrid system by conducting experiment and simulation using MATLAB Simulink.
<b>C408.3</b>	Analyze the Hydel power using MATLAB Simulink and analyze the performance and assessment of Fuel cell by conducting experiment and simulation using MATLAB Simulink.

## GE8076 Professional Ethics in Engineering

<b>C409.1</b>	Gain awareness on human values for professional excellence and stress management
<b>C409.2</b>	Gain knowledge on engineering ethics, moral issues & uses of ethical theories
<b>C409.3</b>	Understand the role of engineers as responsible experimenters along with courses of ethics in engineering field .
<b>C409.4</b>	Gain awareness of responsibilities of an engineer for safety and risc along with risc-benefit analysis
<b>C409.5</b>	Acquire knowledge on global issues and able to apply ethical principles to resolve situations that arise in their professional lives

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## EE8073 Biomedical Instrumentation

<b>C410.1</b>	Identify the functions of human nervous system and describe the basic components of biomedical system and give brief idea of different types of transducers.
<b>C410.2</b>	Identify the functions of human nervous system and describe the basic components of biomedical system and give brief idea of different types of transducers.
<b>C410.3</b>	To understand the different types of electrodes and its placement for various recording
<b>C410.4</b>	Explain the basic principles of imaging techniques and patient monitoring system.
<b>C410.5</b>	Describe the functions of life assisting and therapeutic equipments.

## EE8811 Project Work

<b>C411.1</b>	Identify and apply the real world and societal importance problems in the Electrical and its allied area.
<b>C411.2</b>	Identify, analyze, design, implement and handle prototype projects with a complete and organized solution methodologies
<b>C411.3</b>	Apply modern engineering tools for solution
<b>C411.4</b>	Contribute as an individual or in a team in development of technical projects
<b>C411.5</b>	Develop effective communication skills for presentation of project related activities and prepare reports and examination following professional ethics

  
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**DEPARTMENT OF INFORMATION TECHNOLOGY**

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**COURSE OUTCOMES**

**MA8351 -Discrete Mathematics [C201]**

C201.1	Make use of propositions, predicates and flow of logical proofs.
C201.2	Acquire knowledge on induction and counting principles and to solve recurrence relation.
C201.3	Perceive the knowledge of various types and characteristics of graphs.
C201.4	Interpret concepts and properties of groups, rings and fields.
C201.5	Comprehend the ideas of lattices and Boolean algebra.

**CS8351-Digital principles and System design[C202]**

C202.1	To understand different methods used for the simplification of Boolean functions
C202.2	To understand and design a system that uses combinational logic for the given specification; Simulate combinational logic systems using verilog or VHDL.
C202.3	To understand and design synchronous sequential system for the given specification; Simulate sequential logic systems using verilog or VHDL.
C202.4	To design and implement Asynchronous sequential system for the given specification.
C202.5	To design and implement memory accessing systems and systems using PLA, PAL.

**CS8391-Data structures[C203]**

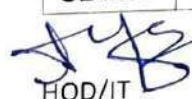
C203.1	Implement abstract data types for linear data structures-List
C203.2	Implement and apply the different linear data structure to problem solutions
C203.3	Implement and apply non-linear data structures tree ADT to problem solutions
C203.4	Implement and apply non-linear data structures Graph ADT to problem solutions
C203.5	Critically analyse the various sorting algorithm.

**CS8392-Object oriented programming[C204]**

C204.1	Develop Java programs using OOP principles
C204.2	Develop Java programs with the concepts inheritance and interfaces
C204.3	Build Java applications using exceptions and I/O streams
C204.4	Develop Java applications with threads and generics classes
C204.5	Develop interactive Java programs using AWT, Swings components with event handling

**EC8394-Analog and Digital Communication[C205]**

C205.1	Illustrate analog communication techniques
C205.2	Explain digital communication techniques
C205.3	Illustrate data and pulse communication techniques
C205.4	Make use of various error control coding techniques to identify/correct errors
C205.5	Outline multi-user radio communication

  
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**CS8381-Data Structures Lab[C206]**

C206.1	Write functions to implement linear and non-linear data structure operations
C206.2	Suggest appropriate linear / non-linear data structure operations for solving a given problem
C206.3	Appropriately use the linear / non-linear data structure operations for a given problem
C206.4	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval

**CS8383-Object Oriented Programming Laboratory[C207]**

C207.1	Develop and implement Java programs for simple applications that make use of classes
C207.2	Develop and implement Java programs for simple applications that make use of packages and interfaces
C207.3	Develop and implement Java programs with array list, exception handling and multithreading.
C207.4	Design applications using file processing, generic programming
C207.5	Design applications using AWT components and event handling

**CS8382-Digital system laboratory[C208]**

C208.1	Apply Boolean simplification techniques to construct combinational logic circuits.
C208.2	Build combinational logic circuits to perform arithmetic operations.
C208.3	Implement combinational circuits using MSI devices.
C208.4	Construct Sequential circuits like registers and counters.
C208.5	Simulate combinational and sequential circuits using HDL.

**HS8381-Interpersonal skills/listening and speaking[C209]**

C209.1	Ability to listen and respond appropriately
C209.2	Ability to participate in group discussions.
C209.3	Ability to make effective presentation.
C209.4	Ability to listen/view and comprehend different spoken discourses/excerpts different accents and to speak clearly in simple language.
C209.5	Ability to participate confidently and appropriately in formal and informal conversations.

**MA8391-Probability and Statistics[C210]**

C210.1	Interpret the axiomatic formulation of Probability theory and random variables as an intrinsic need for the analysis of random phenomena.
C210.2	Identify probability models, function of random variables based on one & two dimensional random variables and determine regression.
C210.3	Apply the concept of testing of hypothesis for small and large samples in real life problems.
C210.4	Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.
C210.5	Have the notion of sampling distributions and statistical techniques used in Engineering and management problem

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**CS8491-Computer Architecture[C211]**

C211.1	Understand the basics structure of computers, operations and instructions
C211.2	Design arithmetic and logic unit
C211.3	Understand pipelined execution and design control unit .
C211.4	Understand Parallel Processing architectures
C211.5	Understand the various Memory systems and I/O communications

**CS8492-Database Management Systems[C212]**


C212.1	Classify the modern and futuristic database applications based on size and complexity
C212.2	Map ER model to Relational model to perform database design effectively
C212.3	Write queries using normalization criteria and optimize queries
C212.4	Compare and contrast various indexing strategies in different database systems
C212.5	Appraise how advanced databases differ from traditional databases

**CS8451-Design and Analysis of Algorithms[C213]**

C213.1	Analyse the complexity of algorithms for various computing problems
C213.2	Design and analyse solutions to problems based on brute force, divide and conquer solutions to a problem.
C213.3	Design and analyse solutions to problems based on dynamic programming and greedy approach.
C213.4	Design and analyse solution to problems based on iterative improvement method.
C213.5	To modify existing algorithms to improve efficiency .

**CS8493-Operating Systems[C214]**

C214.1	Explain the basic concepts ,functions of operating system and system calls
C214.2	Outline various threading models ,process synchronization, Compare the performance of various CPU scheduling algorithm and deadlocks .
C214.3	Compare and contrast various memory management schemes
C214.4	Explain I/O management file systems
C214.5	Perform administrative tasks on Linux servers ,compare ios, Android operating Systems.

  
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**GE8291-Environmental Science and Engineering[C215]**

C215.1	Gain knowledge on flora and fauna in our environment helps to know about social environment.
C215.2	Gain knowledge on the offensive effects of pollution in the day-to-day life.
C215.3	Acquire knowledge on the natural resources available and their conservation.
C215.4	Have adequate knowledge on the concepts of adverse effects of social issues like acid rain and global warming.
C215..5	Get knowledge about the problems .

**CS8481-Database Management Systems Laboratory[C216]**

C216.1	Use typical data definitions and manipulation commands
C216.2	Design applications to test Nested and Join Queries
C216.3	Implement simple applications that use Views
C216.4	Implement applications that require a Front-end Tool
C216 .5	Critically analyze the use of tables, view, functions and procedures.

**CS8461-Operating Systems Lab[C217]**

C217.1	Learn Unix commands and shell programming
C217.2	Implement various CPU Scheduling Algorithms
C217.3	Implement Process Creation and Inter Process Communication.
C217.4	Implement Deadlock Avoidance and Deadlock Detection Algorithms
C217.5	Implement Page Replacement Algorithms and File Organization , File Allocation Strategies

**HS8461-Advanced Reading and Writing[C218]**

C218.1	Function effectively as an individual in multi-disciplinary settings.
C218.2	Able to comprehend and write effective reports.
C218.3	Write different types of essays by understanding the elements and structure of a good essay.
C218.4	Write winning job application and project report, statement of purpose and apply these in their career
C218.5	Read and evaluate texts critically and display critical thinking in various professional contexts.

  
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**MA8551-Algebra and Number Theory[C301]**

C301.1	Apply the basic notations of groups ,rings, field which will be used to solve the related problems.
C301.2	Understand the fundamental concepts of advanced algebra in modern mathematics.
C301.3	Apply the basic knowledge of advanced algebraic techniques in number theory
C301.4	Apply to solve the non-trivial problems related to the concepts and by proving the simple theorem.
C301.5	Apply integrated approach to number theory and abstract algebra.

**CS8591- Computer Networks[C302]**

C302.1	Understand the basic layers and its functions in computer networks and evaluate the performance of the network
C302.2	Understand the basics of how data flows from one node to another.
C302.3	Analyze and design routing algorithms.
C302.4	Design protocols for various functions in the network.
C302.5	Understand the working of various application layer protocols

**EC8691-Microprocessors and Microcontrollers[C303]**

C303.1	Understand architecture of 8086 and Design and implement programs on 8086 Microprocessor.
C303.2	Understand signals, system bus architecture of 8086 and multiprocessor Configuration.
C303.3	Design and implement interfacing of I/O circuits with 8086 microprocessor
C303.4	Understand architecture of 8051 microcontroller
C303.5	Understand architecture of 8051 , Design and implement programs on 8051 microcontroller.

**IT8501- Web Technology[C304]**

C304.1	Design simple web pages using markup languages like HTML and XHTML
C304.2	Create dynamic web pages using DHTML and java script that is easy to navigate and use.
C304.3	Program server side web pages that have to process request from client side web pages
C304.4	Represent web data using XML and develop web pages using JSP.
C304.5	Design various web services to the show the interaction.

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**CS8494-Software Engineering [C305]**

C305.1	Explain the software process and agile development
C305.2	Demonstrate software requirements and Analysis
C305.3	Apply the software design procedure
C305.4	Compare and contrast the various software testing and implementation Techniques
C305.5	Estimate the software project cost and effort

**OCE551- Air pollution and control Engineering [C306.OE1]**

C306.1	Identify the sources of air pollution with its effects and ambient air quality standards & emission
C306.2	Understanding the concept of lapse rates, Atmospheric stability, Plume rise and various other parameters on meteorology.
C306.3	Understanding the role of Gravity separators, Centrifugal separator, Fabric filters and ESP
C306.4	Understanding the role of adsorption, absorption, condensation and incineration techniques
C306.5	Ability to ensure quality control and preventive measures

**OBT553- Fundamentals of Nutrition[C306.OE1]**

C306.1	Ability to understand the basics of nutrition and diet plan
C306.2	Understand the process of digestion
C306.3	Understand the concept of carbohydrates and analyse the blood sugar regulation
C306.4	Understand the structure, composition, roles and levels of intake about proteins and lipids.
C306.5	Analyse the metabolism, energy balance and body composition

  
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**EC8681 Microprocessors and Microcontrollers Laboratory[C307]**

C307.1	Write ALP for Arithmetic operations and logical operations.
C307.2	Interface different I/Os with processor
C307.3	Generate waveforms using Microprocessors
C307.4	Execute Programs in 8051
C307.5	Familiar with 8086 and 8051 simulators

**CS8581- Networks Lab [C308]**

C308.1	Implement various protocols using TCP and UDP.
C308.2	Compare the performance of different transport layer protocols.
C308.3	Use simulation tools to analyze the performance of various network protocols.
C308.4	Analyze various routing algorithms.
C308.5	Implement error correction codes.

**IT8511-Web Technology Laboratory [C309]**

C309.1	Design simple web pages using mark-up languages like HTML.
C309.2	Create dynamic web pages using DHTML and java script that is easy to navigate and use.
C309.3	Program server side web pages that have to process request from client side web pages.
C309.4	Represent web data using XML and develop web pages using JSP.

**IT8601-Computational Intelligence[C310]**

C310.1	Provide a basic exposition to the goals and methods of Computational Intelligence.
C310.2	Study of the design of intelligent computational techniques.
C310.3	Apply the Intelligent techniques for problem solving
C310.4	Improve problem solving skills using the acquired knowledge in the areas of, reasoning
C310.5	Provide Natural language understanding, computer vision, automatic programming and machine learning.

  
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### CS8592-Object Oriented Analysis And Design[C311]

C311.1	Understand the fundamentals of object modelling and unified process.
C311.2	Design software systems with static UML diagrams
C311.3	Design software systems using UML dynamic and implementation diagrams.
C311.4	Transform UML based software design into pattern based design using design patterns
C311.5	Understand the various testing methodologies for OO software.

### IT8602- Mobile Communication[C312]

C312.1	Understand the basic concepts of mobile computing
C312.2	Explain the basics of mobile telecommunication systems
C312.3	Illustrate the generations of telecommunication systems in wireless networks
C312.4	Demonstrate the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network
C312.5	Explain the functionality of Transport and Application layers Develop a mobile application using android/blackberry/ios/Windows SDK

### CS8091-Big Data Analytics[C313]

C313.1	Work with Big Data Tools and Analysis Techniques
C313.2	Analyze data by utilizing clustering and classification algorithms
C313.3	Learn and apply different mining algorithms and recommendation systems for large volumes of data
C313.4	Perform analytics on data streams
C313.5	Learn NoSQL databases and management.

### CS8092-Computer Graphics and Multimedia[C314]

C314.1	Explain the basics of illumination models, color models and output primitives.
C314.2	Design two dimensional graphics and apply two dimensional transformations and clipping techniques to graphics.
C314.3	Design three dimensional graphics and apply three dimensional transformations.
C314.4	Inspect the different types of multimedia file formats
C314.5	Design Basic 3d Scenes using Blender

### IT8076-Software Testing [C315.PE1]

C315.1	Outline the software testing criteria for developing test cases.
C315.2	Build the test cases for software development.
C315.3	Understand the various level of testing.
C315.4	Discuss about the test metrics, measurements and management process.
C315.5	Illustrate the needs of software test automation and make use of the latest test tool for Testing.

  
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**CS8662-Mobile Application Development Lab[C316]**

C316.1	To understand the components and structure of mobile application development frameworks for Android and windows OS based mobiles
C316.2	To understand how to work with various mobile application development frameworks
C316.3	To learn the basic and important design concepts and issues of development of mobile applications.
C317.4	To understand the capabilities and limitations of mobile devices.
C317.5	To understand the components and structure of mobile application development frameworks for Android and windows OS based mobiles

**CS8582 Object Oriented Analysis And Design Laboratory[C317]**

C317.1	Perform OO analysis and design for a given problem specification
C317.2	Identify and map basic software requirements in UML mapping.
C317.3	Improve the software quality using design patterns and to explain the rationale behind applying specific design patterns
C317.4	Test the compliance of the software with SRS

**IT8611-Mini Project[C318]**

C318.1	Map the technical knowledge for solving real world problems.
C318.2	Apply new technologies & design techniques concerned for devising a solution for a given problem statement
C318.3	Apply project management skills (scheduling work, procuring resources and working within the confines of a deadline).
C318.4	Work as an individual or in a team in development of technical projects.
C318.5	Communicate and report effectively project related activities and findings.

**HS8581 Professional Communication[C319]**

C319.1	To enhance the students to make effective presentations.
C319.2	To help the students participate confidently in Group Discussions.
C319.3	To motivate and prepare the students to attend job interviews and be successful in their pursuit.
C319.4	To train and develop the adequate Soft Skills required for the workplace.
C319.5	Ability to interpret different genres of texts, infer implied meanings and evaluate it for ideas as well as for methods of presentation relevant in different situations.

  
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**MG8591- Principles of Management [C401]**

C401.1	Define management and its evolution.
C401.2	Summarize the functions of planning.
C401.3	Summarize the functions of organising.
C401.4	Classify the various directing technique.
C401.5	Identify the various control technique.

**CS8792- Cryptography and Network Security [C402]**

C402.1	Understand the fundamentals of networks security, security architecture, threats and vulnerabilities.
C402.2	Apply the different cryptographic operations of symmetric cryptographic algorithms
C402.3	Apply the different cryptographic operations of public key cryptography
C402.4	Apply the various Authentication schemes to simulate different applications.
C402.5	Understand various Security practices and System security standards

**CS8791-Cloud Computing[C403]**

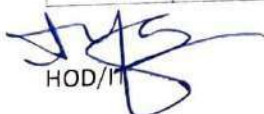
C403.1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
C403.2	Learn the key and enabling technologies that help in the development of cloud
C403.3	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
C403.4	Explain the core issues of cloud computing such as resource management and security. .
C403.5	Be able to install and use current cloud technologies..

**OIE751-Robotics[C404.OE2]**

C404.1	Summarize the basic concepts of industrial robotics and key components of robotics technologies.
C404.2	Summarize the robot drive systems, grippers and various end effectors
C404.3	Describe the various sensors and image processing & data reduction method for the control of robots
C404.4	Analyse the various kinematics of robots and prepare the robot program.
C404.5	Explain the implementations of robots in industries and analysing robot economics.

**CS8081-Internet of Things[C405.PE2]**

C405.1	Understand Smart Objects and IoT Architectures
C405.2	Learn about various IOT-related protocols
C405.3	Build simple IoT Systems using Arduino and Raspberry Pi.
C405.4	Understand data analytics and cloud in the context of IoT
C405.5	Develop IoT infrastructure for popular applications

  
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**GE8071-Disaster Management[C406.PE3]**

C406.1	Understand and Differentiate the types of disasters, causes and their impact on environment and society.
C406.2	Analyse various methods of risk reduction measures as well as mitigation and assess the Vulnerability
C406.3	Understand and examine the hazard and vulnerability profile of India.
C406.4	Value the Disaster damage assessment and recognize how to manage the Disaster.
C406.5	Construct ideas for the various disaster Scenarios in the Society

**IT8711- Foss and Cloud Computing Laboratory[C407]**

C407.1	Configure various virtualization tools such as Virtual Box, VMware workstation
C407.2	Design and deploy a web application in a PaaS environment.
C407.3	Learn how to simulate a cloud environment to implement new schedulers.

**IT8761-Security Laboratory[C408]**


C408.1	Develop code for classical Encryption Techniques to solve the problems..
C408.2	Build cryptosystems by applying symmetric and public key encryption algorithms
C408.3	Construct code for authentication algorithm
C408.4	Develop a signature scheme using Digital signature standard
C408.5	Demonstrate the network security system using open source tools


**GE8076- Professional Ethics In Engineering[C409.PE4]**

C409.1	Describe the human values with regard to the individual life style for the society
C409.2	Explain the role of ethics to the engineering field
C409.3	Describe how engineering is applied in association with ethics based on engineering experimentation
C409.4	Explain the engineering ethics based safety, responsibilities and rights
C409.5	Discuss the global issues of professional ethics in engineering

**IT8078-Web Design and Management[C410.PE5]**

C410.1	Design Website using HTML CSS and JS
C410.2	Design Responsive Sites
C410.3	Manage, Maintain and Support Web Apps
C410.4	Learn the web project management and maintenance process
C410.5	To Design a Website with HTML, JS, CSS / CMS – Word press...

  
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**CS8078-Green Computing[C410.PE5]**

C410.1	To understand the concepts of technologies that conform to low-power computation.
C410.2	To understand green (power-efficient) technologies for components of one single computer, such as CPU, memory and disk, and appreciate cutting edge designs for these components
C410.3	To have a basic understanding of a variety of technologies applied in building a green system and to identify the various key sustainability and green IT trends.
C410.4	To discuss the various laws, standards and protocols for regulating green IT
C410.5	Be able to use a range of tools to help monitor and design green systems

**IT8811-Project Work[C411]**

C411.1	Identify the problem by applying acquired knowledge.
C411.2	Analyse and categorize executable project modules after considering risks.
C411.3	Choose efficient tools for designing project modules
C411.4	Combine all the modules through effective team work after efficient testing.
C411.5	Elaborate the completed task and compile the project report.

  
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**DEPARTMENT OF MECHANICAL ENGINEERING  
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**REGULATION – 2017  
Course Outcomes**

**Course Name : Transforms and Partial Differential Equations (MA8353)**

C201.1	Formulate and solve partial differential equations.
C201.2	Evaluate Fourier series of periodic functions.
C201.3	Apply the method of separation of variables to find the solution of heat and wave equation.
C201.4	Illustrate the Fourier transform techniques.
C201.5	Examine Z transform techniques and solve difference equations.

**Course Name : Engineering Thermodynamics (ME8391)**

C202.1	Understand and apply the concepts of equilibrium, conservation of mass and energy, principles of energy interactions to simple thermal systems.
C202.2	Apply the second law and entropy principles to study simple systems like heat engines, heat pumps and refrigerators etc.
C202.3	Study the phase equilibrium diagrams of various pure substances and analyse vapor power cycles
C202.4	Build thermodynamic relations between various thermodynamic properties to ideal and real gases.
C202.5	Study different psychrometric processes and apply the concepts of psychrometry to solve related problems.

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**Course Name : Fluid Mechanics and Machinery(CE8394)**

C203.1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.
C203.2	Analyse and calculate major and minor losses associated with pipe flow in piping networks.
C203.3	Understand the practical usefulness of dimensional analysis and apply in framing equations for hydraulic systems.
C203.4	Understand the construction, working principle, performance and design analysis of pumps.
C203.5	Understand the construction, working principle, performance and design analysis of turbines.

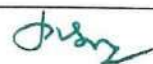
**Course Name : Manufacturing Technology – I (ME8351)**

C204.1	To understand the metal casting processes associated defects, merits and demerits.
C204.2	To impart the knowledge of Different metal joining process.
C204.3	To know the knowledge the various Hot and cold working.
C204.4	To discuss the various sheet metal making processes.
C204.5	To understand the knowledge of various methods of manufacturing plastic components.

**Course Name : Electrical Drives and Control (EE8353)**

C205.1	Classify types of electric drives systems based on nature of loads, control objectives, performance and reliability.
C205.2	Analyse different motor characteristics.
C205.3	Gain knowledge about DC and AC starters.
C205.4	Apply different speed control methods on DC motors
C205.5	Apply different speed control methods on AC motors

  
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**Course : Manufacturing Technology Laboratory**

C206.1	Understand the metal casting processes associated defects, merits and demerits.
C206.2	Understand arc,gas,solid state, resistance welding processes
C206.3	Analyse the process and principles of various metal forming methods
C206.4	Understand the various sheet metal and special forming processes
C206.5	Understand various methods of manufacturing plastic components.

**Course : Computer Aided Machine Drawing**

C207.1	Follow Indian Standards on drawing practices, symbols, geometric dimensioning and tolerances
C207.2	Visualize and Re-create part drawings, sectional views and assembly drawings of machine components as per standards using CAD software and also by manual drawing
C207.3	Visualize and Re-create assembly drawings of machine components as per standards by manual drawing.

**Course : Electrical Engineering Laboratory**

C208.1	Student will be able to Understand the characteristics of DC Machines and AC Machines.
C208.2	Student will be able to Understand the different speed control methods of DC and AC machines.
C208.3	Student will be able to analyse the Synchronous motor

  
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**Course : Interpersonal Skills laboratory / Reading & Speaking (HS8381)**

C209.1	Ability to listen and respond appropriately.
C209.2	Ability to participate in group discussions.
C209.3	Ability to make effective presentations.
C209.4	Ability to listen/view and comprehend different spoken discourses/excerpts different accents and to speak clearly in simple language.
C209.5	Ability to participate confidently and appropriately in formal and informal conversations.

**Course : Statistics and Numerical Methods (MA8452)**

C210.1	Compute basic statistical analysis by identifying the tests, computing mean values, standard deviations and confidence intervals.
C210.2	Adapt Design of Experiments using Annova to test the hypothesis.
C210.3	Solve algebraic and transcendental equations and to find dominant Eigen value of a matrix.
C210.4	Estimate the unknown intermediate values through interpolation and calculate the derivatives, the length and area of irregular objects using numerical differentiation and integration.
C210.5	Assess the initial value problems by single and multistep methods numerically.

**Course : Kinematics of Machinery (ME8492)**

C211.1	Understand various concepts of mechanism and develops mechanism to provide specific motion
C211.2	Analyse the velocity and acceleration of planar mechanisms using graphical method
C211.3	Construct the cam profile for specific follower motion
C211.4	Estimate the size of appropriate gears and gear trains for particular application
C211.5	Apply the concepts of friction to solve problems in machine elements

  
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**Course : Manufacturing Technology – II(ME8451)**

C212.1	Introduce the theory of metal cutting and finding out cutting force in turning process
C212.2	Understand the lathe machine and its parts and various operations involved
C212.3	Familiarize with the shaper, milling and gear cutting calculations.
C212.4	Analyses various abrasive processes and operations broaching machines
C212.5	Understand the various turning and machining calculations

**Course : Engineering Metallurgy (ME8491)**

C213.1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.
C213.2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.
C213.3	Clarify the effect of alloying elements on ferrous and non-ferrous metals.
C213.4	Summarize the properties and applications of non-metallic materials.
C213.5	Explain the testing of materials for various mechanical properties.

**Course : Strength of Materials for Mechanical Engineers(CE8395)**

C214.1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.
C214.2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.
C214.3	Apply basic equation of simple torsion in designing of shafts and helical spring
C214.4	Calculate the slope and deflection in beams using different methods
C214.5	Analyze and design thin and thick shells for the applied internal and external pressures.

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**Course : Thermal Engineering – I (ME8493)**

C215.1	Apply thermodynamic concepts to different air standard cycles, steam power cycles and analyse related problems
C215.2	Explain working principle of various types of air compressors and solve problems
C215.3	Explain the functioning and features of IC engines, its components and combustion in CI and SI engines
C215.4	Calculate performance parameters of IC engines and explain IC engine auxiliaries
C215.5	Describe and analyse open and closed cycle gas turbine plants and their improvement methods

**Course : Manufacturing Technology Lab – II(ME8462)**

C216.1	Understand the basic milling operations.
C216.2	Understand the principle of various gear cutting operations.
C216.3	Understand the principles of various grinding operations.
C216.4	Understand the basic concepts cutting forces
C216.5	Understand the basic concepts of CNC programming.

**Course : Strength of Materials and Fluid Mechanics and Machinery Lab (CE8381)**

C217.1	Perform Tension, Torsion, Hardness, Compression, and Deflection test on rods, plates, springs and beams
C217.2	Perform heat treatment operations, measure hardness and study the influence of heat treatment on mechanical properties
C217.3	Perform strain measurement using Rosette strain gauge
C217.4	Experiment with flow measurement devices such as venturimeter, orifice meter and rotometer for actual flow rate and friction losses
C217.5	Carry out performance test on different hydraulic machineries such as pumps and turbines

  
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### DEPARTMENT OF MECHANICAL ENGINEERING (BE MECHANICAL ENGINEERING)

#### Course : Advanced Reading and Writing (HS8461)

C218.1	Function effectively as an individual in multi-disciplinary settings.
C218.2	Able to comprehend and write effective reports.
C218.3	Write different types of essays by understanding the elements and structure of a good essay.
C218.4	Write winning job application and project report, statement of purpose and apply these in their career.
C218.5	Read and evaluate texts critically and display critical thinking in various professional contexts.

#### Course : Thermal Engineering – II (ME8595)

C301.1	Apply thermodynamic concepts to steam nozzles and analyse related problems
C301.2	Explain the functioning and features of different types of boilers ,its auxiliaries and calculate performance parameters
C301.3	Explain flow in steam turbines and draw the velocity diagrams of single and multi-stage turbines
C301.4	Understand the concepts of cogeneration, working features of heat pumps and heat exchangers
C301.5	Apply the basic concepts of thermodynamics to different types of refrigeration and air conditioning systems and analyse related problems

#### Course : Design of Machine Elements(ME8593)

C302.1	Explain the concepts of principal stresses, theories of failure, stress concentration and fatigue loading
C302.2	Make proper assumptions with respect to material, factor of safety and able to design shafts under fluctuating, combined loads and under critical speed. Design shafts, keys and couplings
C302.3	Analyse the temporary and permanent joints and design joints based on applications.
C302.4	Design different energy storing element (helical springs, compression and tension springs, flywheels) and engine components- (connecting rods and crank shafts)
C302.5	Ability to compute equivalent radial loads for rolling contact bearing and sliding contact bearing and select appropriate bearing from the standard catalogue

  
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**Course : Metrology and Measurements (ME8501)**

C303.1	To understand basics of metrology and their effect on precision, accuracy, errors.
C303.2	To learn about linear and angular measuring instruments, principles and applications
C303.3	To understand about advances in metrology like laser interferometers, CMM
C303.4	To learn about form measurement like straightness, flatness, roundness, thread and surface finish
C303.5	To learn about measurements of power, flow and temperature

**Course : Dynamics of Machines(ME8594)**

C304.1	Analyze forces-motion relationship in standard mechanism and to design a flywheel based on energy fluctuation
C304.2	Analyze balancing problems in rotating and reciprocating machinery and to determine the unbalance forces and couples in a system.
C304.3	Understand the fundamentals of different type of vibratory motion and solve problems related to SDOF free damped and un-damped vibration systems.
C304.4	Analyze the forced vibration of damped SDOF systems and understand the significance of force transmissibility and vibration isolation.
C304.5	Understand the principles in mechanisms used for speed control and stability control and solve problem related to their applications

**Course : Open Elective : Environment and Agriculture(OAI551)**

C305A.1	To gain knowledge on the issues of with respect to land use and land scape changes. Students able to gain the knowledge about water quality, globalization and agro eco system.
C305A.2	To understand the environmental impacts with respect to erosion and deposition problems in irrigation and mechanized agriculture etc.
C.305A.3	To gain knowledge on the basic concepts of Climate Change, Water scarcity and water shortage.
C305A.4	To understand the ecosystem, ecological diversity, farming principles and forest fragmentation.
C305A.5	To understand the alternate culture systems, Mega farms and vertical farms , Agricultural environment policies and its impacts

  
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#### Course : Kinematics and Dynamics Laboratory(ME8511)

C306.1	Explain gear parameters, kinematics of mechanisms and determine mass moment of inertia of mechanical element.
C306.2	Demonstrate basic concepts of balancing of forces and couples in rotating and reciprocating mechanical system.
C306.3	Determine vibration response of mechanical elements.
C306.4	Demonstrate working Principles of different types of Governor and Gyroscopic effect on the mechanical system

#### Course : Thermal Engineering Laboratory (ME8512)

C307.1	Able to draw valve timing of four stroke engines and port timing of two stroke engines and to determine flash and fire power points of fuels
C307.2	Ability to conduct experiments on single cylinder diesel and multi cylinder petrol engines with electrical ,mechanical and hydraulic loading and to study the performance characteristics and draw heat balance
C307.3	Ability to conduct experiments on steam boiler and steam turbine and to study the performance characteristics
C307.4	Conduct tests on heat conduction apparatus and evaluate thermal conductivity of materials and natural and forced convection apparatus to evaluate heat transfer coefficient
C307.5	Conduct tests on radiative heat transfer apparatus and evaluate Stefan Boltzmann constant and emissivity. Conduct tests to evaluate the performance of parallel / counterflow heat exchanger apparatus
C307.6	Conduct tests of on Air compressors, Heat exchangers, Refrigeration and Air-conditioning test rigs to study and evaluate their performance.

#### Course : Metrology and Measurements Laboratory (ME8513)

C308.1	Gain knowledge about length and thickness measuring equipments
C308.2	Gain knowledge about angle measuring equipments
C308.3	Get familiar with flatness and straightness equipments.
C308.4	Gain knowledge about screw threads and gear tooth parameters
C308.5	Gain knowledge on force, torque and temperature measuring equipments

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### DEPARTMENT OF MECHANICAL ENGINEERING (BE MECHANICAL ENGINEERING)

#### Course : Design of Transmission Systems (ME8651)

C309.1	Design a power transmission system through belt, rope, and chain drive to meet desired needs in engineering applications.
C309.2	Understand Gear Terminology and Design spur and helical gear drive by considering strength and life.
C309.3	Understand the tooth terminology and apply the standard procedure for design of Bevel, Worm and Crossed Helical gears drives.
C309.4	Design of Gear box using standard step ratio, shows its speeds in stages through ray diagram and kinematic arrangement.
C309.5	Analyze and Design the Clutches, Brakes and Cam according to the requirement.

#### Course : Computer Aided Design and Manufacturing (ME8691)

C310.1	Demonstrate the various stages of design and manufacturing of any product
C310.2	Use modeling features of curves, surfaces and solids in designing simple components
C310.3	Build up the algorithms in making simple curves and for visualization schemes such as viewing, shading and coloring
C310.4	Carry out assembly modeling and execute assembly analysis by understanding concepts such as mating, interferences, tolerance, geometric and mass properties.
C310.5	Use Standards for computer graphics, exchanging data and images and communication between the CAD systems

#### Course : Heat and Mass Transfer (ME8693)

C311.1	Apply heat conduction equations to different surface configuration under steady state and transient conditions and solve conduction based problems
C311.2	Apply free and forced convection heat transfer correlations to internal and external flow through/over various surface configurations and solve problems.
C311.3	Explain the phenomena of boiling and condensation, apply LMTD and NTU methods of thermal analysis to different types of heat exchanger configurations and solve problems,
C311.4	Explain basic laws for radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems.
C311.5	Apply diffusive and convective mass transfer equation and correlation to solve problems for different application.

  
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**Course : Finite Element Analysis (ME8692)**

C312.1	To understand numerical methods and analytical methods involved in Finite Element method and to understand Ritz technique and weighted residual methods for deriving finite element governing equations.
C312.2	To understand the role and significance of shape functions in finite element formulations and use linear, quadratic, and cubic shape functions for interpolation in global, local, and natural coordinates for the formulation of One-dimensional elements used to solve Structural, thermal and Eigen value problems.
C312.3	To understand the formulation of Two-dimensional elements to solve scalar variable problems.
C312.4	To understand the formulation of Two-dimensional elements to solve vector variable problems.
C312.5	To understand shape function of Isoparametric one-two dimensional, higher order elements (serendipity). Its numerical integration and its application to plane stress problems

**Course : Hydraulics and Pneumatics (ME8694)**

C313.1	Explain fluid power principles and fundamentals
C313.2	Discuss the hydraulic systems and components
C313.3	Explain the hydraulic circuit
C313.4	Explain the pneumatic circuit
C313.5	Explain design hydraulic and pneumatic circuit

**Course : Automobile Engineering (ME8091)**

C314A.1	Recognize the various parts of the automobile with their functions and materials.
C314A.2	Discuss the engine auxiliary systems and engine emission control.
C314A.3	distinguish the working of different types of transmission systems
C314A.4	Explain the steering, brakes and suspension systems.
C314A.5	Predict possible alternate source of energy for IC engines.

  
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### Course : Gas Dynamics and Jet Propulsion (ME8096)


C314B.1	Apply the concept of compressible flow in variable area ducts.
C314B.2	Apply the concept of compressible flow in constant area ducts.
C314B.3	Examine the effect of compression and expansion waves in compressible flow.
C314B.4	Use the concept of gas dynamics in Jet Propulsion.
C314B.5	Apply the concept of gas dynamics in Space Propulsion.

### Course : CAD / CAM Laboratory (ME8681)

C315.1	To Develop 2D Part AND 3D Part Models using CAD Software
C315.2	To develop 3D Assembly Models using CAD Software
C315.3	To Understand the CNC Control in Modern Manufacturing System
C315.4	To Prepare CNC Part Programming and Perform Manufacturing

### Course : Design and Fabrication Project (ME8682)

C316.1	Identify methods and materials to carry out experiments/develop code.
C316.2	Reorganize the procedures with a concern for society, environment and ethics.
C316.3	Design the CAD model and model calculations
C316.4	Explain and Carry out necessary fabrication works as per the design.
C316.5	Prepare a report as per recommended format and defend the work.

  
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#### Course : Professional Communication (HS8581)

C317.1	To enhance the students to make effective presentations.
C317.2	To help the students participate confidently in Group Discussions.
C317.3	To motivate and prepare the students to attend job interviews and be successful in their pursuit.
C317.4	To train and develop the adequate Soft Skills required for the workplace.
C317.5	Ability to interpret different genres of texts, infer implied meanings and evaluate it for ideas as well as for methods of presentation relevant in different situations.

#### Course : Power Plant Engineering (ME8792)

C401.1	Explain the layout, construction and working of the components inside a thermal power plant.
C401.2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
C401.3	Explain the layout, construction and working of the components inside nuclear power plants.
C401.4	Explain the layout, construction and working of the components inside Renewable energy power plants.
C401.5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.

#### Course : Process Planning and Cost Estimation (ME8793)

C402.1	Explain Introduction to Process Planning
C402.2	Discuss the Process Planning Activities
C402.3	Explain the Introduction to Cost Estimation
C402.4	Explain the production Cost Estimation
C402.5	Explain the Machining Time Calculation and details

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#### Course : Mechatronics (ME8791)

C403.1	Discuss the interdisciplinary applications of Electronics, Electrical, Mechanical and Computer Systems for the Control of Mechanical, Electronic Systems and sensor technology.
C403.2	Discuss the architecture of Microprocessor and Microcontroller, Pin Diagram, Addressing Modes of Microprocessor and Microcontroller.
C403.3	Discuss Programmable Peripheral Interface, Architecture of 8255 PPI, and various device interfacing
C403.4	Explain the architecture, programming and application of programmable logic controllers to problems and challenges in the areas of Mechatronic engineering.
C403.5	Discuss various Actuators and Mechatronics system using the knowledge and skills acquired through the course and also from the given case studies

#### Course Name: Simulation & Analysis Laboratory (ME8711)

C407.1	Model and simulate simple mechanisms using MATLAB & ADAMS
C407.2	Model and analyse trusses, cables, beams with different support conditions
C407.3	Model and analyse plates and simple shells with different loading conditions
C407.4	Model and analyse axisymmetric components and cylindrical shells for thermal stresses
C407.5	Model and analyse beams for finding out natural frequencies

#### Course Name: Mechatronics Laboratory (ME8782)

C408.1	Demonstrate the functioning of mechatronics system with various pneumatic, hydraulic and electrical systems.
C408.2	Demonstrate the functioning of control systems with the help of PLC and microcontrollers
C408.3	Ability to understand the functioning of various types of transducers.
C408.4	Ability to understand the functioning of image processing technique.

  
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#### Course Name: Technical Seminar (ME8712)

C409.1	Determine a technical topic from the field of engineering and application
C409.2	Prepare presentation and report for the same topic
C409.3	Analyze a current topic of professional interest and present it before audience

#### Course Name: Principles of Management (ME8581)

C410.1	Understande the managerial functions like planning, organizing, staffing, leading & controlling
C410.2	The basic knowledge on international aspect of management
C410.3	The basic knowledge on management and its evolution
C410.4	A knowledge on budgetary control and their strategies
C410.5	A understanding of the motivational theories existing in the management

#### Course name : Production Planning and Control

C411.1	Explain various production control methods which can be applied to specific situations and state their relationship to the product/process involved.
C411.2	Make forecasts in the manufacturing and service sectors using selected quantitative and qualitative techniques.
C411.3	Apply the principles and techniques for planning and control of the production and service systems to optimize/make best use of resources.
C411.4	Understand the importance and function of inventory and to be able to apply selected techniques for its control and management under dependent and independent demand circumstances
C411.5	Demonstrate and explain the use of Manufacturing Requirements Planning (MRP2), Just - In - Time (JIT) techniques in terms of operation and their importance in Lean World Class Manufacturing.

  
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**Course Name : Project Work (ME8811)**

C413.1	Identify a topic in advanced areas of Mechanical Engineering and Identify methods and materials to carry out experiments/develop code
C413.2	Review literature to identify gaps and define objectives & scope of the work and Reorganize the procedures with a concern for society, environment and ethics
C413.3	Generate and implement innovative ideas for social benefit Analyze and discuss the results to draw valid conclusions
C413.4	Develop prototypes/models, experimental set-up and software systems necessary to meet the objectives and Prepare a report as per recommended format and defend the work
C413.5	Explore the possibility of publishing papers in peer reviewed journals/conference proceedings

  
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**REGULATION – 2017**


**COURSE OUTCOMES**

**MA5165 Statistical Methods for Engineers (C101)**

CO CODE	COURSE OUTCOME
C101.1	Obtain the value of the point estimators using the method of moments and method of maximum likelihood.
C101.2	Use various test statistics in hypothesis testing for mean and variances of large and small samples.
C101.3	Determine the regression line using the method of least square and also to calculate the partial and multiple correlation coefficient for the given set of data points.
C101.4	Test the hypothesis for several means using one way, two way or three way classifications.
C101.5	Get exposure to the principal component analysis of random vectors and matrices.

**CN5101 Modern Construction Materials (C102)**

CO CODE	COURSE OUTCOME
C102.1	Explain the various types of special concretes
C102.2	Select the different processing of steel and applications of coating
C102.3	Explain the manufacturing process and applications of polymer composites
C102.4	Identify the different flooring materials and application of façade materials
C102.5	Apply the knowledge of smart and intelligent materials in construction field

  
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**CN5102 Construction Equipment (C103)**

CO CODE	COURSE OUTCOME
C103.1	Develop knowledge on planning of equipment and selection of equipment
C103.2	Explain the knowledge on fundamentals of earth work operations, earth moving operations and types of earth work equipment
C103.3	Develop the knowledge on special construction equipment's
C103.4	Apply the knowledge on asphalt and concrete plants
C103.5	Apply the knowledge and select the proper materials handling equipment

**CN5103 Construction Planning, Scheduling and Control (C104)**

CO CODE	COURSE OUTCOME
C104.1	Identify and estimate the activity in the construction
C104.2	Schedule the networking of activities using critical path method
C104.3	Evaluate the project budget required for the particular construction project
C104.4	Recognize the various quality control tool required in the construction industry
C104.5	Explain the different databases that can be maintained in a construction industry using computers.

**CN5001 Advanced Concrete Technology (C105)**

CO CODE	COURSE OUTCOME
C105.1	Understand the testing of concrete making materials as per IS code and admixtures
C105.2	Know the procedure to determine the properties of fresh and hardened of concrete.

  
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C105.3	Design of concrete mix and grade as per IS codes and ACI method.
C105.4	Describe the application and use of special concrete.
C105.5	Know the methods and techniques involved in the concrete for various structures.

**CN5003 Quantitative Techniques in Management (C106)**

CO CODE	COURSE OUTCOME
C106.1	Apply the knowledge of science and engineering fundamentals in learning the concept of operations research and its practical applicability for solving challenges in construction.
C106.2	Identify, formulate, plan and schedule construction engineering projects.
C106.3	Apply the knowledge of financial management and cost concepts.
C106.4	Design the required man, material, equipment, cost and time as per needs by proper decision rules.
C106.5	Analyze the cost by break-even analysis and modern construction management software.

**CN5201 Advanced Construction Techniques (C107)**

CO CODE	COURSE OUTCOME
C107.1	Understand the modern construction techniques used in the sub structure construction.
C107.2	Demonstrate knowledge and understanding of the principles and concepts relevant to super structure construction for buildings
C107.3	Understand the concepts used in the construction of special structures
C107.4	Knowledge on Various strengthening and repair methods for different cases.
C107.5	Identify the suitable demolition technique for demolishing a building.

  
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**CN5202 Contract Laws and Regulations (C108)**

CO CODE	COURSE OUTCOME
C108.1	Design the construction contracts
C108.2	Develop a skill for the tendering process.
C108.3	Explain the duties of the arbitrator.
C108.4	Develop an idea on the various legal requirements to be met in relation to land and construction.
C108.5	Identify and apply the provisions provided in the labour welfare schemes.

**CN5203 Computer Applications in Construction Engineering and Planning (C109)**

CO CODE	COURSE OUTCOME
C109.1	Use of software's in construction Industry.
C109.2	Apply various optimization techniques.
C109.3	Apply Deterministic and Probabilistic Inventory Models.
C109.4	Analyze the scheduling concepts.
C109.5	Solve problems using simulation and ERP systems.

**CN5204 Economics and Finance Management in Construction (C110)**

CO CODE	COURSE OUTCOME
C110.1	Describe the basic principles of Economic in construction
C110.2	Evaluate alternate proposals
C110.3	Evaluate alternative investments

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C110.4	Select best source of finance for a project
C110.5	Manage the finance and accounting

**CN5006 Construction Project Management (C111)**

CO CODE	COURSE OUTCOME
C111.1	Identify the stages involved in a project and analyze the obligatory services to be taken up while performing a construction activity.
C111.2	Apply the professional skills acquired in managing a construction project.
C111.3	Develop the ability to attain an equilibrium among Innovation, Technology and Economic feasibility.
C111.4	Cultivate an idea on effective resource utilization and identify factors affecting job productivity.
C111.5	Estimate the cost of construction project.

**CN5007 Construction Personnel Management (C112)**

CO CODE	COURSE OUTCOME
C112.1	Identify, select and plan the manpower in construction project
C112.2	Strategize and classify the structure of organization and operations
C112.3	Interpret the human relations and significance of organisational behaviour
C112.4	Formulate welfare measure for personnel in construction sector
C112.5	Develop methods to manage quantitative and qualitative performance

  
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**CN5211 Advanced Construction Engineering and Computing Techniques (C113)**

CO CODE	COURSE OUTCOME
C113.1	Compare and analyse the methods of mix proportioning and effect of admixtures in concrete
C113.2	Practice the test of NDT and workability tests on concrete
C113.3	Apply the analytical techniques and graphical analysis to interpret the experimental data
C113.4	Schedule project data and generate reports with graphical information
C113.5	Simulate the risks involved in construction project

**CN5212 Practical Training I (C114)**

CO CODE	COURSE OUTCOME
C114.1	Gained first-hand knowledge of practical problems in carrying out engineering tasks
C114.2	Gather knowledge in communication and interpersonal skills
C114.3	Developed skills in facing and solving the field problems

**CN5301 Quality Control and Assurance in Construction (C201)**

CO CODE	COURSE OUTCOME
C201.1	Achieve the knowledge of quality management guidelines, quality circles.
C201.2	Apply the quality standards for preparing Quality system documents.
C201.3	Explain the skill of preparing inspection procedures for quality planning.
C201.4	Select the techniques and tools for Quality Assurance and

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	Control in Construction Industry.
C201.5	Achieve the knowledge of quality improvement techniques

**CN5010 Resource Management and Control in Construction (C202)**

CO CODE	COURSE OUTCOME
C202.1	Identify the different types of resources in a construction industry
C202.2	Evaluate the labour productivity and the influencing factors
C202.3	Calculate the equipment output and its operation condition of construction equipment
C202.4	Describe the terms of cash inflow, cash outflow and balance sheet
C202.5	Categorize the time and cost related information's in a construction sector.

**CN5011 Project Safety Management (C203)**

CO CODE	COURSE OUTCOME
C203.1	Develop the knowledge on accidents and their causes
C203.2	Develop the knowledge about safety programmes safety programme job-site safety assessment
C203.3	Apply the knowledge contractual obligations
C203.4	Explain about designing for safety and safety procedures
C203.5	Develop the knowledge owners' and designers responsibility

**CN5311 Practical Training II (C204)**

  
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CO CODE	COURSE OUTCOME
C204.1	Gained first-hand knowledge of practical problems in carrying out engineering tasks
C204.2	Gather knowledge in communication and interpersonal skills
C204.3	Developed skills in facing and solving the field problems

**CN5312 Seminar (C205)**

CO CODE	COURSE OUTCOME
C205.1	Work on a specific technical topic in CEM domain to acquire skills of oral presentation
C205.2	Acquire technical writing abilities for seminars and conferences
C205.3	Present the topic using visual aids and interact with students

**CN5313 Project Work (C206)**

CO CODE	COURSE OUTCOME
C206.1	Understand the problem areas in construction engineering and management
C206.2	Prioritize the objectives for the selected research area
C206.3	Application of literature data to frame methodology of phase 2

**CN5411 Practical Training III (C207)**

  
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CO CODE	COURSE OUTCOME
C207.1	Gained first-hand knowledge of practical problems in carrying out engineering tasks
C207.2	Gather knowledge in communication and interpersonal skills
C207.3	Developed skills in facing and solving the field problems

**CN5412 Project Work (C208)**

CO CODE	COURSE OUTCOME
C208.1	Apply literature survey from phase 1 to implement methodology
C208.2	Experiment the process involved and analyse the results
C208.3	Provide suggestions and recommendations for the objectives of project

  
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