RAVINDRA
COLLEGE OF ENGINEERING FOR WOMEN
Approved by AICTE, New Delhi & Affiliated to JNTUA, Anantapuramu
Nandikotkur Road, Pasupala Village, Venkayapalli, Kurnool - 518452, Andhra Pradesh
(An ISO 9001:2008 Certified Institution)

R19 REGULATION
COURSE OUTCOMES

I-I

Course Name: **ALGEBRA & CALCULUS** **C101** **Course Year:2019-20**

C101.1	Apply the principle of matrices to solve linear system of equations using matrices reduction technique using Eigen values and Eigen vectors etc
C101.2	Analyze the behavior of function by using mean value theorems.
C101.3	Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies.
C101.4	Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates.
C101.5	Evaluate multiple integrals in Cartesian, cylindrical and spherical geometrics
C101.6	Conclude the use of special function in evaluating definite integrals

Course Name: **CHEMISTRY** **C102** **Course Year:2019-20**

C102.1	Determine the different orbital energy levels ,properties and bonding of homo and hetro molecules
C102.2	Compare various types of batteries based on their construction of materials and sensors.
C102.3	Analyze the materials of construction for battery and electrochemical sensors.
C102.4	Able to choose the type of polymers based on properties and applications.
C102.5	Apply the principles of spectrometry, GC and HPLC in separation of gaseous and liquid mixtures
C102.6	Find biological activates of given materials using biological mechanism

Course Name: **PROBLEM SOLVING & PROGRAMMING** **C103** **Course Year:2019-20**

C103.1	Inspect the internal parts of a computer, and peripherals.
C103.2	Develop an Algorithm and use it to solve computational problems
C103.3	Apply modular approach for solving the problem
C103.4	Structure the individual data elements to write efficient memory utilization solutions
C103.5	Design a sorting algorithm based on the type of data
C103.6	Recognize the importance of programming language independent constructs

Course Name: **ENGINEERING GRAPHICS LAB** **C104** **Course Year:2019-20**

C104.1	Apply BIS standards of engineering drawingto draft letters.
C104.2	Sketch conic sections and curves for given specifications
C104.3	Measure true lengths of a line when inclined to planes.
C104.4	Construct front view and top view of a given solid by using orthographic projections
C104.5	Draw isometric and orthographic projections of planes and solids.
C104.6	Draw orthographic and isometric drawings using AutoCAD

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Course Name: **ENGINEERING & WORKSHOP LAB** **C105** **Course Year:2019-20**

C105.1	Build various carpentry joints with a given wood sample.
C105.2	Construct prototypes of Straight fit, V- fit joints on given MS steel samples.
C105.3	Prepare rectangular tray, and open Cylinder models using Tin smithy sheet.
C105.4	Connect one lamp with one or two switch controls.
C105.5	Prepare various types of joints by Welding.
C105.6	Build various carpentry joints with a given wood sample.

Course Name: **CHEMISTRY LAB** **C106** **Course Year:2019-20**

C106.1	Determine the cell constant and conductance of solutions.
C106.2	Prepare the different types of advanced polymer materials.
C106.3	Prepare the polymer materials and use the various industries.
C106.4	measure the strength of an acid present in secondary batteries
C106.5	Measure strength of given acid with respect to energy.
C106.6	analyse the given organic compound with the data of IR and NMR.

Course Name: : **PROBLEM SOLVING & PROGRAMMING LAB** **C107**
Course Year:2019-20

C107.1	Construct a Computer given its parts
C107.2	Estimate the right control structure for solving a problem
C107.3	Analyze different sorting algorithms
C107.4	Design solutions for computational problems
C107.5	Design programs which utilize the memory efficiently using programming constructs like pointers.
C107.6	Develop C Programs to store, access and retrieve data from files.

I-II

Course Name: **BASIC ELECTRONICS AND ELECTRONICS ENGINEERING** **C108**
Course Year:2019-20

C108.1	Apply DC and AC circuits using Kirchhoff's laws & superposition theorem.
C108.2	Analyze principles of DC& AC machines and characteristics of efficiencies.
C108.3	Analyze the various power stations, transmission & distribution
C108.4	Design electronic circuits using analog components
C108.5	Analyze functionality of combinational circuits using logic gates.
C108.6	Understand the various of communications systems

Course Name: **PROBABILITY & STATISTICS** **C109** **Course Year:2019-20**

C109.1	Analyze the data quantatively or categorically, measure of averages and variability

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C109.2	Adopt the correlation methods and principle of least squares and regression analysis
C109.3	Apply Bayes theorem to real time problems
C109.4	Apply Binomial and Poisson distributions for real data to compute probabilities, theoretical frequencies.
C109.5	Apply the concept of hypothesis testing for large samples
C109.6	Understand concepts of t-test, f-test and chi-square test for small samples

Course Name: **APPLIED PHYSICS** **C110** **Course Year:2019-20**

C110.1	Identify the wave properties of light and interaction of energy with matter.
C110.2	Analyse dielectrics and magnetic materials and applications in different fields.
C110.3	Apply electromagnetic wave propagation in different guided media.
C110.4	Estimate conductivity of semiconductors and applications in electronic devices.
C110.5	Interpret the difference between normal conductor and superconductor.
C110.6	Apply the basic properties of nanomaterial's in various engineering branches.

Course Name: **DATA STRUCTURES** **C111** **Course Year:2019-20**

C111.1	Analyze the given algorithm with respect to time and space complexities.
C111.2	Compare various sorting and searching algorithms with respect to time and space complexities
C111.3	Apply linked lists to implement various data structures.
C111.4	Compare and contrast various operations on different Search Trees.
C111.5	Determine minimum cost solution for a given graph by constructing spanning tree.
C111.6	Organize appropriatedata& file structures on given data with respect to storage and retrieval.

Course Name: **COMMUNICATIVE ENGLISH-I** **C112** **Course Year:2019-20**

C112.1	Adopt techniques for effective oral and written communication.
C112.2	Apply effective reading strategies in comprehending given texts.
C112.3	Apply the LSRW skills to the societal communication.
C112.4	Analyze the textual concepts in oral or written medium using standard form of English language.
C112.5	Demonstrate the acquired knowledge in executing different pieces of writing.
C112.6	Apply the significance of team work in problem solving techniques.

Course Name: **COMPUTER SCIENCE & ENGINEERING WORK SHOP** **C113**
Course Year:2019-20

C113.1	Know about the internal parts of a computer.
C113.2	Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
C113.3	Interconnect two or more computers for information sharing.
C113.4	Access the Internet and Browse it to obtain the required information.
C113.5	Prepare Slide presentations using the presentation tool.
C113.6	Storytelling by creating Graphics, Webpages and videos.

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Course Name: **COMMUNICATIVE ENGLISH-I LAB** **C114** **Course Year:2019-20**

C114.1	Adopt techniques for effective oral and written communication.
C114.2	Apply effective reading strategies in comprehending given texts.
C114.3	Apply the LSRW skills to the societal communication.
C114.4	Analyze the textual concepts in oral or written medium using standard form of English language.
C114.5	Demonstrate the acquired knowledge in executing different pieces of writing.
C114.6	Apply the significance of team work in problem solving techniques.

Course Name: **BASIC ELECTRONICS AND ELECTRONICS ENGINEERING LAB** **C115**
Course Year:2019-20

C115.1	verifyKirchhoff's laws & superposition theorem for a given network.
C115.2	Perform experiments on dc & ac machines to draw the characteristics curves.
C115.3	Verify truth tables of given Boolean equation by implementing hardware using logic gates.
C115.4	Fabricate given circuit by soldering components on a general purpose PCB.
C115.5	Measure ripple factor of Half wave rectifier and Full wave rectifier .
C115.6	Measure ripple factor of Half wave rectifier and Full wave rectifier

Course Name: **APPLIED PHYSICS LAB** **C116** **Course Year:2019-20**

C116.1	Measure the wavelength and thickness of source and film using interference and diffraction principles fromNewtonsrings,Wedge method and spectrometer expts.
C116.2	Determine the properties of given laser sourse and optical fibre.
C116.3	Sketch the intensity of the magnetic field with distance and B-H curve for a given magnetic material.
C116.4	Determine energy gap in a given semiconductor..
C116.5	Measure the thermistor charecterstics and inductance of the coil using Wheatstone bridge .
C116.1	Measure the wavelength and thickness of source and film using interference and diffraction principles fromNewtonsrings,Wedge method and spectrometer expts.

Course Name: **DATA STRUCTURES LAB** **C117** **Course Year:2019-20**

C117.1	Choose appropriate data structure to solve a problem
C117.2	Implement Linear data structures.
C117.3	Implement appropriate sorting/searching technique for given data.
C117.4	Create a software for file processing.
C117.5	Implement Non-Linear data structures.
C117.6	Evaluate a given postfix expression by using stacks.

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II-I

Course Name: **MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE** **C201**
Course Year:2020-21

C201.1	Illustrate various formal proof methods for validating the arguments
C201.2	Understand and apply the mathematical logic with different notations
C201.3	Discuss various types of relations, functions and algebraic structures
C201.4	Apply counting techniques to solve computational problems
C201.5	List various techniques to solve the recurrence relations
C201.6	Illustrate the concept of trees and graphs and their implementation using algorithms.

Course Name: **DIGITAL LOGIC DESIGN** **C202** **Course Year:2020-21**

C202.1	Analyze the number systems and codes.
C202.2	Decide the Boolean expressions using Minimization methods.
C202.3	Analyze and design clocked sequential circuits.
C202.4	Design complex digital systems by using sequential and combinational circuit components.
C202.5	Describe various types of memories.
C202.6	Describe the most common integrated circuit digital logic families

Course Name: **DESIGN THINKING** **C203** **Course Year:2020-21**

C203.1	Understand the product development phases occurring in innovation cycle
C203.2	Understand the principles, benefits,& process in Design Thinking
C203.3	Create new ideas by considering the idea generation techniques
C203.4	Apply Design Thinking Business models in Information Technology
C203.5	Generate & develop different design models
C203.6	Apply Design strategy in Service design

Course Name: **DATABASE MANAGEMENT SYSTEMS** **C204** **Course Year:2020-21**

C204.1	Design a Database using the principles of appropriate Data Model
C204.2	Apply SQL queries to store, process and retrieve information
C204.3	Apply PL/SQL concepts for data access and manipulation
C204.4	Apply normalization techniques to eliminate data redundancy
C204.5	Understand Query Processing & Query Optimization techniques
C204.6	Apply and relate the concept of transaction processing, concurrency control and recovery in database.

Course Name: **OBJECT ORIENTED PROGRAMMING THROUGH JAVA** **C205**
Course Year:2020-21

C205.1	Solve object oriented problems using java language
C205.2	Construct efficient inheritance programs with packages
C205.3	Implement exception handling with user defined exceptions

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C205.4	Create effective multi threaded java applications
C205.5	Construct class reusability process by using inheritance
C205.6	Implement collections and generic data structures from framework

Course Name: **PYTHON PROGRAMMING** **C206** **Course Year:2020-21**

C206.1	To learn the fundamentals and list the basic constructs of Python
C206.2	To introduce a function-oriented and recursion programming paradigm through python
C206.3	To elucidate problem-solving and apply conditional execution of the program
C206.4	To develop simple applications by using modules, packages and exception handling concepts
C206.5	To apply object orientation concepts, data structures and files to solve problems
C206.6	To design object oriented programs using Python for solving real-world problems

Course Name: **DATABASE MANAGEMENT SYSTEMS LAB** **C207**
COURSE YEAR:2020-21

C207.1	Create a relation and apply SQL queries to store, process and retrieve information
C207.2	Create a user and grant privileges
C207.3	Apply aggregate functions in SQL
C207.4	Apply PL/SQL concepts for data access and manipulation
C207.5	Design a program using functions and procedures
C207.6	Design a database and normalize tables.

Course Name: **OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB** **C208**
COURSE YEAR:2020-21

C208.1	Apply portable programs which work in all environments
C208.2	Create user friendly interface programs
C208.3	Solve problems using object oriented approach and design robust solutions
C208.4	Design UI applications using keyboard & mouse listeners
C208.5	Build exception handling mechanism
C208.6	Develop TCP & UDP network oriented applications

Course Name: **PYTHON PROGRAMMING LAB** **C209** **Course Year:2020-21**

C209.1	Solve Computational Problems using Python
C209.2	Understand fundamentals of types of Python Variables, Objects, Abstraction and Data Types
C209.3	Design logic for problems using Python concepts and its applications
C209.4	Develop Python programs for numerical and text based problems
C209.5	Differentiate between mutable and immutable objects
C209.6	understand the object-oriented concepts using Python in problem solving

Course Name: **ENVIRONMENTAL SCIENCE** **C210** **Course Year:2020-21**

C210.1	Classify the renewable energy resources and non-renewable energy resources and

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	applications
C210.2	Survey the different types of ecosystems and hotspots of India.
C210.3	Decide protection biodiversity, values of biodiversity and endangered species.
C210.4	Analyse the reasons of pollution and prevention of pollution.
C210.5	Identify the different types of water conservation methods and rehabilitations, resettlement problems.
C210.6	Appraise the local area environment conditions and field work project.

II-II

Course Name: **NUMBER THEORY AND APPLICATIONS** **C211** **Course Year:2020-21**

C211.1	Classify the renewable energy resources and non-renewable energy resources and applications
C211.2	Survey the different types of ecosystems and hotspots of India.
C211.3	Decide protection biodiversity, values of biodiversity and endangered species.
C211.4	Analyse the reasons of pollution and prevention of pollution.
C211.5	Identify the different types of water conservation methods and rehabilitations, resettlement problems.
C211.6	Appraise the local area environment conditions and field work project.

Course Name: **COMPUTER ORGANIZATION** **C212** **Course Year:2020-21**

C212.1	Summarize computer peripherals like input output devices, memory
C212.2	Develop arithmetic operations flow chat and memory management
C212.3	Organise memory and input output device
C212.4	Inspect memory and input output device interface circuit
C212.5	Model read/write cycle of memory/ I/O device and pipelining process
C212.6	Inspect throughput by organizing a computer with parallel processing in large computer system

Course Name: **DESIGN AND ANALYSIS OF ALGORITHMS** **C213** **Course Year:2020-21**

C213.1	Understand the concept of pseudo-code for writing an algorithm and analyze the asymptotic performance of various algorithms
C213.2	Understand the techniques divide and conquer to solve the problems
C213.3	Understand algorithm for designing techniques like Greedy approach & Dynamic programming in exploring various related application problems.
C213.4	Understand the concept of trees and graphs and gives the knowledge of analysis of various graph, tree traversal algorithms
C213.5	Construct efficient algorithm for designing paradigms of backtracking and Branch & Bound in solving problems.
C213.6	Understand the variations among tractable and intractable problems which are able to classify P and NP classes.

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Course Name: **ENTREPRENEURSHIP** **C214** **Course Year:2020-21**

C214.1	Understand the evolution, revolution, mindset & qualities of an entrepreneur
C214.2	Understand the social & ethical issues faced by the entrepreneur
C214.3	Develop the creative pursuit of innovative ideas by the entrepreneur within the organization
C214.4	Apply the methods of attracting investments in startupsby introducing business models or plans
C214.5	Assess the entrepreneurial opportunities in marketing ventures
C214.6	Understand the legal & regulatory challenges faced by entrepreneur

Course Name: **OPERATING SYSTEMS** **C215** **Course Year:2020-21**

C215.1	Realize how applications interact with the operating system & Analyze the functioning of a kernel in an Operating system.
C215.2	To Analyze various scheduling algorithms
C215.3	Summarize resource management in operating systems & Apply memory management techniques in design of operating systems
C215.4	Understand the deadlock prevention and avoidance & Understand the functionality of file system
C215.5	Perform administrative tasks on Linux based systems
C215.6	To acquiring knowledge about various countermeasures to security attacks

Course Name: **SOFTWARE ENGINEERING** **C216** **Course Year:2020-21**

C216.1	Obtain basic software life cycle activity skills.
C216.2	Design software requirements specification for given problems.
C216.3	Implement structure, object oriented analysis and design for given problems.
C216.4	Design test cases for given problems.
C216.5	Apply testing techniques on the developed software.
C216.6	Apply quality management concepts at the application level.

Course Name: **OPERATING SYSTEMS LAB** **C217** **Course Year:2020-21**

C217.1	Trace different CPU Scheduling algorithm
C217.2	Implement Bankers Algorithms to Avoid and prevent the Dead Lock
C217.3	Evaluate Page replacement algorithms
C217.4	Illustrate the file organization techniques
C217.5	Illustrate shared memory process
C217.6	Design new scheduling algorithms

Course Name: **SOFTWARE ENGINEERING LAB** **C218** **Course Year:2020-21**

C218.1	Acquaint with historical and modern software methodologies

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C218.2	Understand the phases of software projects and practice the activities of each phase
C218.3	Practice clean coding
C218.4	Take part in project management
C218.5	Adopt skills such as distributed version control, unit testing, integration testing, build management, and deployment
C218.6	Understand the metrics for quality attributes for any application

Course Name: **BIOLOGY FOR ENGINEERS** **C219** **Course Year:2020-21**

C219.1	Understand the basic structure of cell life
C219.2	Remember what are biomolecules and their role in living cells
C219.3	Understand the mechanism & process of important human functions
C219.4	Remember the recombinant DNA technology & its applications in various fields
C219.5	Write about gene structure & its replications in various cells
C219.6	Obtain about transgenic plants & animals and their production

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COURSE OUTCOMES
CSE &CSE(AI)

I-I

Course Name: **LINEAR ALGEBRA & CALCULUS** **C101** **Course Year:2020-21**

C101.1	Develop the use of matrix algebra techniques that is needed by engineers for practical Applications.
C101.2	Interpret the Eigen values and Eigen vectors of matrix in terms of the transformation it represents in to a matrix Eigen value problem.
C101.3	Utilize mean value theorems to real life problems.
C101.4	Familiarize with functions of several variables which is useful in optimization.
C101.5	Apply important tools of calculus in higher dimensions and will become familiar with 2- dimensional coordinate systems.
C101.6	Analyze 3- dimensional coordinate systems and utilization of special functions.

Course Name: **CHEMISTRY** **C102** **Course Year: 2020-21**

C102.1	Apply Schrodinger wave equation to hydrogen atom.
C102.2	Illustrate the molecular orbital energy level diagram of different molecular species.
C102.3	Analyze splitting in octahedral and tetrahedral geometry of complexes
C102.4	Apply Nernst equation for calculating electrode and cell potentials.
C102.5	Demonstrate the preparation, properties and applications of Bakelite, Nylon-6,6, and carbon fibers
C102.6	Analyze the different types of spectral series in electromagnetic spectrum.

Course Name: **C-PROGRAMMING & DATA STRUCTURES** **C103** **Course Year: 2020-21**

C103.1	Construct a Computer given its parts and Analyse the basic concepts of C Programming language.
C103.2	Design applications in C, using Arrays, Functions and Pointers and Structures
C103.3	Apply the concepts of Stacks and Queues in solving the problems
C103.4	Explore various operations on Linked lists.
C103.5	Demonstrate various tree traversals and graph traversal techniques using Stack and Queue
C103.6	Analyze different Searching & Sorting algorithms

Course Name: **BASIC ELECTRICAL AND ELECTRONICS ENGINEERING** **C104** **Course Year: 2020-21**

C104.1	Apply DC and AC circuits using Kirchhoff's laws & superposition theorem.
C104.2	Analyze principles of DC & AC machines and characteristics of efficiencies.
C104.3	Analyze the various power stations, transmission & distribution
C104.4	Design electronic circuits using analog components.

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C104.5	Understand the basic building blocks of linear integrated circuits and its characteristics and analyze the applications of operational amplifiers
C104.6	Analyze the concepts and understand the procedures for the analysis and design of Combinational and sequential circuits.

Course Name: **ENGINEERING WORKSHOP** **C105** **Course Year: 2020-21**

C105.1	Build various carpentry joints with a given wood sample.
C105.2	Construct prototypes of Straight fit, V- fit joints on given MS steel samples.
C105.3	Prepare rectangular tray, and open Cylinder models using Tin smithy sheet.
C105.4	Connect one lamp with one or two switch controls.
C105.5	Prepare various types of joints by Welding.
C105.1	Build various carpentry joints with a given wood sample.

Course Name: **IT WORKSHOP** **C106** **Course Year: 2020-21**

C106.1	Know about the internal parts of a computer.
C106.2	Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
C106.3	Interconnect two or more computers for information sharing.
C106.4	Access the Internet and Browse it to obtain the required information.
C106.5	Prepare slide presentation using the presentation tool
C106.6	Know about the internal parts of a computer.

Course Name: **CHEMISTRY LAB** **C107** **Course Year: 2020-21**

C107.1	Determine the cell constant and conductance of solutions.
C107.2	Prepare the different types of advanced polymer materials.
C107.3	Prepare the polymer materials and use the various industries.
C107.4	Measure the strength of an acid present in secondary batteries
C107.5	Measure strength of given acid with respect to energy.
C107.6	Analyse the given organic compound with the data of IR and NMR.

Course Name: **C-PROGRAMMING & DATA STRUCTURES LAB** **C108** **Course Year: 2020-21**

C108.1	Demonstrate basic concepts of C programming language
C108.2	Develop C programs using functions, arrays, structures and pointers
C108.3	Illustrate the concepts Stacks and Queues
C108.4	Design operations on Linked lists(singly, doubly and circular)
C108.5	Apply various Binary tree traversal techniques
C108.6	Develop searching and sorting methods

Course Name: **BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB** **C109**
Course Year: 2020-21

C109.1	Apply knowledge of mathematics, science, and engineering to the analysis and design of electric circuits and magnetic circuits.
C109.2	Apply the knowledge of basic circuital law and simplify the network using reduction techniques

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C109.3	Evaluate transient response, Steady state response, network functions of different circuits.
C109.4	Measuring various parameters of different diodes with the help of volt-ampere characteristics.
C109.5	Analyze the effect of filters in reducing the ripple factor of various rectifier circuits.
C109.6	Verify truth tables of given Boolean equation by implementing hardware using logic gates.

I-II

Course Name: **PROBABILITY &STATISTICS** **C110** **Course Year: 2020-21**

C110.1	Analyze the data quantatively or categorically, measure of averages and variability
C110.2	Adopt the correlation methods and principle of least squares and regression analysis
C110.3	Apply Bayes theorem to real time problems
C110.4	Apply Binomial and Poisson distributions for real data to compute probabilities, theoretical frequencies.
C110.5	Apply the concept of hypothesis testing for large samples
C110.6	Understand concepts of t-test, f-test and chi-square test for small samples

Course Name: **APPLIED PHYSICS** **C111** **Course Year: 2020-21**

C111.1	Study the different realms of physics and their applications in both scientific andtechnological systems through physical optics
C111.2	Identify the wave properties of light and the interaction of energy with the matter
C111.3	Asses the electromagnetic wave propagation and its power in different media
C111.4	Understand the response of dielectric and magnetic materials to the applied electric and magnetic fields.
C111.5	Study the quantum mechanical picture of subatomic world along with the discrepancies of electron transportation phenomena by free electron theory and band theory
C111.6	Elaborate the physical properties exhibited by materials through the understanding ofproperties of semiconductors and superconductors

Course Name: **COMMUNICATIVE ENGLISH** **C112** **Course Year: 2020-21**

C112.1	Retrieve the knowledge of basic grammatical concepts.
C112.2	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
C112.3	Apply grammatical structures to formulate sentences and correct word forms.
C112.4	Analyze discourse markers to speak clearly on a specific topic in informal discussions
C112.5	Evaluate reading/listening texts and to write summaries based on global

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	comprehension of these texts.
C112.6	Create a coherent paragraph interpreting a figure/graph/chart/table.

Course Name: **PYTHON PROGRAMMING & DATA SCIENCE** **C113** **Course Year: 2020-21**

C113.1	Demonstrate fundamentals of Python programming
C113.2	Create user-defined functions and exceptions in Pyhton
C113.3	Analyze and manipulate Data using Pandas
C113.4	Creating static, animated, and interactive visualizations using Matplotlib
C113.5	Describe different Classification and Cluster techniques
C113.6	Describe RNN, CNN

Course Name: **ENGINEERING DRAWING** **C114** **Course Year: 2020-21**

C114.1	Draw various curves applied in engineering.
C114.2	Draw different curves such as cycloid, involute and hyperbola.
C114.3	Draw the projections of points, lines and differentiate between projected length and true length
C114.4	Draw the projection of solid inclined to one plain and both the plains.
C114.5	Draw the sectional views of prism, cylinder, pyramid and cone
C114.6	Draw the development of regular solids such as prism, cylinder, pyramid and cone

Course Name: **ENGINEERING GRAPHICS LAB** **C115** **Course Year: 2020-21**

C115.1	Use computers as a drafting tool
C115.2	Draw isometric and orthographic drawings using CAD packages
C115.3	Understand the usage of 2D and 3D modeling
C115.4	Apply the utility of drafting &modelling packages in orthographic and isometric Drawings
C115.5	Draw the graphical representation of machine components.
C115.6	Draw the graphical representation of isometric views of simple solids.

Course Name: **COMMUNICATIVE ENGLISH LAB** **C116** **Course Year: 2020-21**

C116.1	Spell English vowels and consonant sounds in a correct manner.
C116.2	Apply effective writing strategies in paraphrasing and précis writing.
C116.3	Develop listening skills and also perform various listening activities.
C116.4	Participate in various activities for enhancing effective presentational skills.
C116.5	Develop the stage dynamics and also body language essential for effective presentation
C116.6	Improve upon speaking skills in formal and informal communication.

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(An ISO 9001:2008 Certified Institution)

Course Name: **APPLIED PHYSICS LAB** **C117** **Course Year: 2020-21**

C117.1	Measure the wavelength and thickness of source and film using interference and diffraction principles from Newtons rings,Wedge method and spectrometer expts.
C1172	Determine the properties of given laser source and optical fibre.
C117.3	Sketch the intensity of the magnetic field with distance and B-H curve for a given magnetic material.
C117.4	Determine energy gap in a given semiconductor.
C117.5	Measure the thermistor characteristics and inductance of the coil using Wheatstone bridge.
C117.6	Apply the principles of semiconductors in various electronic devices

Course Name: **PYTHON PROGRAMMING & DATA SCIENCE LAB** **C118** **Course Year: 2020-21**

C118.1	Demonstrate numeric data types and arithmetic operators in Python
C118.2	Illustrate the use of various data structures in Python
C118.3	Create arrays using Numpy and apply indexing and slicing on arrays
C118.4	Determine summary statistics on various kinds of data and demonstrate File handling in Python
C118.5	Apply Machine Learning algorithms to solve real-world problems
C118.6	Build an Artificial Neural Network and test the same using appropriate data sets

Course Name: **UNIVERSAL HUMAN VALUES** **C119** **Course Year: 2020-21**

C119.1	Understand the need for holistic development
C119.2	Apply the concept of value education for continuous happiness and prosperity
C119.3	Understand the need of harmony within oneself
C119.4	Analyze the meaning of trust, mutual happiness and the values of relation ships
C119.5	Analyze harmony in co-existence with nature
C119.6	Apply professional ethics for holistic understanding and responsibility towards the society

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Department of Computer Science and Engineering

Course Outcomes – R15 Scheme

COs of First year (Common to All Branches)

Course Name:**FUNCTIONAL ENGLISH** **C101** **Course Year: 2015-16**

C101.1	Summarize the various aspects of English Grammar.
C101.2	Analyze the different situations of speaking and writing skills.
C101.3	Apply the LSRW skills to the societal communication.
C101.4	Analyze the importance of English in Science and Technological context.
C101.5	Demonstrate the acquired knowledge in executing the technical writing.
C101.6	Apply the significance of team work in problem solving technique.

Course Name:**MATHEMATICS-I** **C102** **Course Year: 2015-16**

C102.1	Apply mathematical principles to solve first and second order differential equations.
C102.2	Analyse non-homogeneous linear differential equations of second &higher order linear equations.
C102.3	Apply the differential equations of second and higher order in Electrical Circuits, Simple Harmonic motion &Deflection of beams.
C102.4	Estimate the series expansion, Maxima and minima of functions involving 2 variable &radius of curvature.
C102.5	Evaluate the integrals by using multiple integrals and change of order of integration.
C102.6	Analyze the vector calculus involving divergence, curl, green's theorem, stokes and Gauss theorems.

Course Name:**COMPUTER PROGRAMMING** **C103** **Course Year: 2015-16**

C103.1	Understand problem solving techniques
C103.2	Understand representation of a solution to a problem
C103.3	Understand the syntax and semantics of C programming language
C103.4	Understand the significance of Control structures
C103.5	Learn the features of C language
C103.6	Identify and Learn to solve different computational Problems

Course Name:**ENGINEERING PHYSICS** **C104** **Course Year: 2015-16**

C104.1	Demonstrate the physical optics, lasers, fiber optics, and ultrasonics in different fields.
C104.2	Judge different types of crystal structures using X-ray Diffraction
C104.3	Outline the quantum mechanics which involves De 'Broglie hypothesis and electron theory of metals.
C104.4	Identify applications of semiconductors and magnetic materials in electronic devices.
C104.5	Interpret the difference between normal conductor and superconductor
C104.6	Illustrate the basic properties of nanomaterials in various engineering branches.

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Course Name:**ENGINEERING DRAWING** **C105** **Course Year: 2015-16**

C105.1	ApplyBIS standards of engineering drawingto draft letters.
C105.2	Sketch conic sections and curves for given specifications
C105.3	Measure true lengths of a line when inclined to planes.
C105.4	Construct front view and top view of a given solid by using orthographic projections
C105.5	Draw isometric and orthographic projections of planes and solids.
C105.6	Develop orthographic view of a given isometric object.

Course Name: **ENGLISH LANGUAGE COMMUNICATION SKILLS LAB C106 Course Year: 2015-16**

C106.1	Spell the English vowels and consonant sounds in a correct manner.
C106.2	Apply intonation techniquesin uttering the sentences.
C106.3	Develop listening skills by performing various listening activities.
C106.4	Participate in various activities like JAM, presenting a topic to improve presentational skills.
C106.5	Adopt stage dynamics and right body language for effective presentation.
C106.6	Improve formal&informalpublicspeaking skills.

Course Name:**ENGINEERING PHYSICS LAB** **C107** **Course Year: 2015-16**

C107.1	Measure the wavelength of different colors of white light and dispersive power of prism by using spectrometer.
C107.2	Measure the thickness of thin object & radius of curvature of plain-convex lens by using the principles of interference
C107.3	Determine the properties of given laser source.
C107.4	Determine the acceptance angle and numerical aperture of an optical fiber.
C107.5	Estimate the intensity of the magnetic field with distance and B-H curve for a given magnetic material.
C107.6	Determine energy gap in a given semiconductor.

Course Name:**COMPUTER PROGRAMMING LAB** **C108** **Course Year: 2015-16**

C108.1	Learn C Programming language
C108.2	To make the student solve problems, implement algorithms using C language.
C108.3	Construct a Computer given its parts
C108.4	Develop C programs efficiently in terms of space and time complexities
C108.5	Develop C Programs to store, access and retrieve data from files
C108.6	Analyze different sorting algorithms

Course Name:**ENGLISH FOR PROFESSIONAL COMMUNICATION** **C109** **Course Year: 2015-16**

C109.1	Summarize the various aspects of English Grammar.
C109.2	Analyze the wide range of techniques involved in speaking and writing skills.
C109.3	Apply the LSRW skills for the professional communication.
C109.4	Analyze the significance of English in Science and Technological context.
C109.5	Demonstrate the acquired knowledge in executing the technical writing skills.
C109.6	Apply the significance of team work in problem solving methods.

Course Name:**MATHEMATICS-II** **C110** **Course Year: 2015-16**

C110.1	Apply the concepts of Laplace, Fourier & z-transforms & find their transforms of elementary functions.
C110.2	Develop Laplace transform techniques for solving ordinary differential equations.
C110.3	Evaluate Fourier series expansions of the periodic functions.
C110.4	Interpret the Fourier integral theorem along with Fourier sine and cosine transformation.
C110.5	Formulate the partial differential equations through elimination of arbitrary constants and also

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	understand the technique of separation of variables.
C110.6	Apply z-transform techniques to solve difference equations.

Course Name:**DATA STRUCTURES** **C111 Course Year: 2015-16**

C111.1	Define asymptotic Notations to analyze performance of algorithms and use appropriate data structures like arrays, linked list to solve real world problems.
C111.2	Understand the linked implementation and its uses both in linear and non-linear data structure.
C111.3	Implement the operation of creation ,insertion ,deletion on linear data structure and develop the applications.
C111.4	Apply the operation of creation ,insertion ,deletion on non -linear data structure and develop the application.
C111.5	Find time complexity notations for various sorting and searching techniques.
C111.6	Analyse the collision resolution techniques to resolve the collision in hash tables.

Course Name **ENGINEERING CHEMISTRY** **C112 Course Year: 2015-16**

C112.1	Apply different water treatment techniques find the nature of water samples
C112.2	Able to choose the type of polymers based on properties and applications.
C112.3	Compare various types of batteries based on their construction, materials and sensors.
C112.4	Select the metal without corrosion process and prevent thee corrosion of metals.
C112.5	Utilize the principle of refinery systems, refining of petroleum and uses of energy resources.
C112.6	Choose the materials and use various construction fields.

Course Name:**ENVIRONMENTAL STUDIES** **C113** **Course Year: 2015-16**

C113.1	Classify the renewable energy resources and non-renewable energy resources and applications
C113.2	Survey the different types of ecosystems and hotspots of India.
C113.3	Decide protection biodiversity , values of biodiversity and endangered species.
C113.4	Analyze the reasons of pollution and prevention of pollution.
C113.5	Identify the different types of water conservation methods and rehabilitations, resettlement problems.
C113.6	Appraise the local area environment conditions and field work project.

Course Name:**DATA STRUCTURES LAB** **C114 Course Year: 2015-16**

C114.1	Select appropriate data structures as applied to specified problem definition.
C114.2	Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures
C114.3	Students will be able to implement Linear data structures
C111.4	Students will be able to implement Non-Linear data structures.
C114.5	Implement appropriate sorting/searching technique for given problem.
C114.6	Design advance data structure using Non Linear data structure

Course Name **: ENGINEERING & IT WORKSHOP** **C115 Course Year: 2015-16**

C115.1	Build various carpentry joints with a given wood sample.
C115.2	Construct prototypes of Straight fit, V- fit joints on given MS steel samples.
C115.3	Prepare rectangular tray, and open Cylinder models using Tin smithy sheet.
C115.4	Connect one lamp with one or two switch controls.
C115.5	Prepare various types of joints by Welding.
C115.6	Disassemble and Assemble a Personal Computer

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COMPUTER SCIENCE AND ENGINEERING DEPARTMENT

II-I

Course Name: **MATHEMATICS III C201 Course Year: 2016-17**

C201.1	Demonstrate the knowledge of matrix calculation as an elegant and powerful mathematical language in connection with rank of a matrix, linear system of equations, linear dependence and independence.
C201.2	Interpret the Eigen values and Eigen vectors of a matrix, define a quadratic form and determine its nature using Eigen values.
C201.3	Explain algebraic and transcendental equations employing bisection method, false position method and Newton-Raphson method and solve systems of equations by Crout's and Gauss-Seidel methods.
C201.4	Apply The knowledge of Interpolation and extrapolation by Newton's forward and backward methods and central difference method along with Lagrange's interpolation method for unequally spaced points.
C201.5	Apply the concepts of curve fitting by the method of least squares, numerical differentiation and integration.
C201.6	Interpret the numerical solutions of ordinary differential equations employing Taylor series, Euler's, Picard's and Runga-kutta methods.

Course Name: **DATABASE MANAGEMENT SYSTEMS C202 Course Year: 2016-17**

C202.1	Design a database using the principles of an appropriate data model
C202.2	Apply relational algebra operations, tuple and domain relational calculus for information processing
C202.3	Apply SQL queries to create a simple database
C202.4	Apply normalization techniques to improve database design
C202.5	Apply and relate the concept of transaction processing, concurrency control and recovery in database.
C202.6	Apply the concepts of different data storage and access methods

Course Name:**DISCRETE MATHEMATICS C203 Course Year: 2016-17**

C203.1	Apply the knowledge of Mathematical Logic and Predicate calculus to solve problems
C203.2	Simplify and Solve the practical examples of sets, functions, relations and recurrence relations.
C203.3	Construct different algebraic structures by using concepts of groups, sub groups, monoids and rings
C203.4	Apply the ability to learn the basic concepts about relations, functions and to draw different diagrams like Lattice, Hasse diagrams.
C203.5	Summarize the basic concepts associated with Graphs and Trees.
C203.6	Identify the different counting techniques like permutations and combinations related to mathematics and computer science.

Course Name:**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING C204 Course Year:2016-17**

C204.1	Summarize DC and AC circuits using different methods and laws.
C204.2	Analyze the principle of operation of DC machines along with the various tests to predetermine the efficiency and regulation.
C204.3	Analyze the principle & operation of 3 phase AC machines and their characteristics.
C204.4	Build knowledge on semiconductor diodes, and their applications of diodes & rectifiers
C204.5	Explain the concepts of Bipolar Junction Transistor, FET to meet the given specifications.
C204.6	Analyze the operational amplifiers and oscillators.

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Course Name: **DIGITAL LOGIC DESIGN** **C205 Course Year: 2016-17**

C205.1	Apply knowledge of Number Systems, Boolean Algebra and Logic Gates to draw a logic circuit for a given Boolean Function.
C205.2	Simplify and solve Boolean Equations by using K-Maps, Boolean Laws and Tabulation method.
C205.3	Construct combinational circuits for a given set of data by using Boolean functions.
C205.4	Construct sequential circuits, registers and counters for a given set of data by using Boolean functions, latches and flip-flops.
C205.5	Construct Programmable Logic devices circuits by using Boolean functions.
C205.6	Compare digital logic families with its characteristics.

Course Name:**MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS C206 Course Year: 2016-17**

C206.1	Analyze the scope of managerial economics to attain optimal decisions by considering managerial tools and techniques.
C206.2	Analyze the concept of elasticity of demand, its types and measurement along with demand forecasting methods.
C206.3	Analyze the functions of production concept, factors of technical relationships which impacts various costs on production to get maximum profits.
C206.4	Analyze the changing business environment in post liberalization scenario, to know types ofmarkets and how firms determine their production levels in different competitive situations.
C206.5	Apply how business will maintain accounting books and financial position of the business in the market and its cycle.
C206.6	Apply various capital budgeting methods to take decisions towards investment proposals and projects.

Course Name:**DATABASE MANAGEMENT SYSTEM LAB C207 Course Year: 2016-17**

C207.1	Apply the basic concepts of Database Management System and its Applications.
C207.2	Design a data model using ER model for a given problem-domain
C207.3	Apply SQL queries to store, process and retrieve information
C207.4	Create a database schema for a given problem-domain
C207.5	Create views on a database.
C207.6	Apply PL/SQL concepts for data access and manipulation

Course Name:**BASIC ELECTRICAL AND ELECTRONICS ENGINEERINGLAB C208**
Course Year: 2016-17

C208.1	Analyze the concept of circuit laws and network theorems and apply them to laboratory measurements
C208.2	Discuss systematically obtain the equations that characterize the performance of an electric circuit as well as solving both DC Machines and single-phase transformer.
C208.3	Discuss the working of different diodes, transistors, and measuring instructions. identifying the procedure of doing the experiment.
C208.4	Discuss the working of configuration and their input & output characteristics identifying the procedure of doing the experiment.
C208.5	Analyze measurement of ripple factor of HWR and FWR
C208.6	Analyze Study of logic gates AND, OR, EXOR and NOT.

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II-II

Course Name:**PROBABILITY AND STATISTICS** **C209** **Course Year: 2016-17**

C209.1	Build basic concepts of probability and statistics and implement in solving practical engineering problems
C209.2	Apply discrete and continuous probability distributions to evaluate the probability of real world problems
C209.3	Construct hypotheses tests concerning population parameters for single and multiple populations based on sample data.
C209.4	Build concepts of t-test f-test and chi-square test for small samples
C209.5	Demonstrate the ability to design, use, and interpret control charts for variables.
C209.6	Demonstrate the knowledge and understand various queuing models

Course Name:**SOFTWARE ENGINEERING** **C210** **Course Year: 2016-17**

C210.1	Develop a software project from requirements to implementation.
C210.2	Build Software requirements, Life cycle Model and SRS document.
C210.3	Illustrate the importance of modeling and modeling languages.
C210.4	Compare the quality control and how to ensure good quality software.
C210.5	Develop to code and test the software.
C210.6	Organize to plan, Estimate and Maintain software systems.

Course Name:**COMPUTER ORGANIZATION** **C211** **Course Year: 2016-17**

C211.1	Analyze various internal stages of a modern computer
C211.2	Compare instructions of basic computer along with their addressing modes
C211.3	Analyze the computer algorithms for arithmetic operations
C211.4	Design computer memory hierarchy based on speed and cost
C211.5	Build Interface I/O devices to a computer to transfer data among various I/O sources
C211.6	Relate the concepts of different pipelining techniques and interprets the concepts of multiprocessor architectures.

Course Name: **MICROPROCESSORS & INTERFACING C212** **Course Year: 2016-17**

C212.1	Compare the architectures of 8bit & 16bit intel microprocessors
C212.2	Develop 8086 assembly language programs with different addressing mode instructions
C212.3	Design memory interfacing to 8086 microprocessor
C212.4	Design I/O and Timer interfacing to 8086 microprocessor and to develop assembly language programs
C212.5	Build interface USART, PIC and DMA controllers to 8086 microprocessor
C212.6	Design simple real time applications using 8051 microcontroller

Course Name:**OBJECT ORIENTED PROGRAMMING USING JAVA C213** **Course Year: 2016-17**

C213.1	Solve object oriented problems using Java language.
C213.2	Construct efficient multitasking programs with exceptions handling.
C213.3	Design various applets for internet applications
C213.4	Create user friendly interface GUI by using AWT
C213.5	Construct class reusability process by using inheritance
C213.6	Design menu driven programs for web based applications.

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Course Name:**FORMAL LANGUAGES AND AUTOMATA THEORY C214 Course Year: 2016-17**

C214.1	Classify machines with their power to recognize languages.
C214.2	Construct finite state diagrams while solving problems of computer science.
C214.3	Distinguish between Regular and Non-Regular languages.
C214.4	Simplify the Grammars and reduce it a normal form.
C214.5	Design Push Down Automations for the Context Free Grammars/Languages.
C214.6	Build Turing Machines for the problems.

Course Name:**MICROPROCESSORS & INTERFACING LABORATORY C215 Course Year: 2016-17**

C215.1	Demonstrate 8086 assembly language programming using MASM and TASM
C215.2	Develop assembly language programs for arithmetic, logic and string manipulation operations
C215.3	Develop 8086 assembly language programs with DOS and BIOS calls
C215.4	Test various I/O modules for 8086 microprocessor
C215.5	Analyze the ALP in 8251 USART and display devices with 8086 microprocessor.
C215.6	Develop assembly language programs for 8051 microcontroller to test serial communication, timers and port operations

Course Name: **JAVA PROGRAMMING LABORATORY C216 Course Year: 2016-17**

C216.1	Apply portable programs which work in all environments
C216.2	Create user friendly interface programs
C216.3	Solve problems using object oriented approach and design robust solutions
C216.4	Design UI applications using keyboard & mouse listeners
C216.5	Build exception handling mechanism
C216.6	Develop TCP & UDP network oriented applications

III-I

Course Name: **OPERATING SYSTEMS C301 Course Year: 2017-18**

C301.1	Discuss computer system resources and the role of operating system in their management policies and algorithms.
C301.2	Analyze the process management policies and scheduling of processes by CPU
C301.3	Evaluate the requirement for process synchronization and coordination handled by operating system.
C301.4	Analyze the memory management and its allocation policies.
C301.5	Discuss the storage management policies with respect to different storage management technologies.
C301.6	Discuss the special purpose operating system.

Course Name: **COMPUTER NETWORKS C302 Course Year: 2017-18**

C302.1	Choose the transmission media depending on the requirements.
C302.2	Design computer network logically.
C302.3	Analyze OSI Reference Model and in particular have a good knowledge of Layers
C302.4	Classify the routing protocols and analyze how to assign the IP addresses for the given network.
C302.5	Explain the functions of each layer in OSI and TCP/IP model.
C302.6	Design new protocols for computer network.

Course Name:**OBJECT ORIENTED ANALYSIS & DESIGN C303 Course Year: 2017-18**

C303.1	Analyze the structure of complex systems
C303.2	Design the Conceptual model of UML and SDLC
C303.3	Analyze classes and relationships

C303.4	Discuss various classes modelling techniques and instances modelling techniques
C303.5	Explain interaction diagrams and their modelling techniques
C303.6	Analyze events and signals and their modelling techniques

Course Name:**PRINCIPALS OF PROGRAMMING LANGUAGE C304** **Course Year: 2017-18**

C304.1	Analyze the concepts of various programming languages and its paradigms.
C304.2	Identify the features of attribute grammars and draw parse trees.
C304.3	Construct different parameter passing techniques of different programming languages by selecting various data types.
C304.4	Apply the concepts of object oriented programming in C++, Ada95, PROLOG, and Smalltalk.
C304.5	Analyze the concepts of semaphores, monitors, message passing.
C304.6	Analyze functional programming languages and scripting languages.

Course Name: **SOFTWARE TESTING** **C305** **Course Year: 2017-18**

C305.1	Develop test models to analyze consequences of bugs.
C305.2	Analyze path testing by using flow graphs and regular expressions.
C305.3	Analyze transaction flow, data flow and domain testing.
C305.4	Analyze logic based & Transition Testing by using decision tables and KV graphs.
C305.5	Illustrate graph based testing process by using good and bad state graphs and testability tips.
C305.6	Apply node reduction algorithm to find out reduced adjacency matrix

Course Name: **R PROGRAMMING** **C307** **Course Year: 2017-18**

C307.1	Illustrate the fundamentals of 'R' programming
C307.2	Apply statistical methods such as analysis of variance and linear regression
C307.3	Explain data-sets to create testable hypotheses and identify appropriate statistical tests.
C307.4	Create Business insights by implementing R Analytics
C307.5	Analyze the data and results using R programming
C307.6	Make use of various analytical methods to produce presentation quality graphics.

Course Name:**OBJECT ORIENTED ANALYSIS AND DESIGN & SOFTWARE TESTING LABORATORY C309 Course Year: 2017-18**

C309.1	Design UML structural diagrams for various applications.
C309.2	Design UML behavioral diagrams for various applications.
C309.3	Solve various C programs on decision making and looping
C309.4	Develop various C programs and Introspect for causes of failure.
C309.5	Design test cases and generate reports for software systems
C309.6	Make use of winrunner tool to run an application

Course Name: **OPERATING SYSTEM LABORATORY** **C310** **Course Year: 2017-18**

C310.1	Apply operating system algorithms
C310.2	Model the file allocation strategies
C310.3	Apply Banker's algorithm for deadlock avoidance
C310.4	Discuss page replacement algorithms
C310.5	Analyze shared memory at parent & child communication
C310.6	Apply SJF algorithm

Course Name: **SOCIAL VALUES & ETHICS** **C311** **Course Year: 2017-18**

C311.1	Understand the ideas of values, ethics, and morality in a multicultural context
C311.2	Understand how universal values can be uncovered by different means, including scientific

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	investigation, historical research, or public debate and deliberation (what some philosophers call a dialectic method)
C311.3	Understand and discuss the idea of moral relativism and the challenges it poses to universal values
C311.4	Critically assess the relationship between theory and practice in the formulation of values
C311.5	Understand that values arise from lived experiences, but need to be justified to others
C311.6	Understand the role of deliberation and debate in framing such values

Course Name:**COMPILER DESGN** **C312** **Course Year: 2017-18**

C312.1	Analyze the phases of compiler with the steps involved in it.
C312.2	Analyze the role of lexical analysis using LEX tool by applying pattern matching primitives.
C312.3	Apply top-down and bottom-up parsing techniques for a given grammar.
C312.4	Analyze syntax directed translations schemes and intermediate code generation
C312.5	Analyze storage allocation strategies and symbol table concept
C312.6	Analyze code optimization & code generation phases in compiler

Course Name: **DATA WAREHOUSING AND MINING** **C313** **Course Year: 2017-18**

C313.1	Design a data warehouse with dimensional modelling and apply OLAP operations.
C313.2	Apply pre-processing techniques for data cleaning
C313.3	Develop a comprehensive understanding of how several data mining techniques can be applied to solve problems.
C313.4	Design and deploy appropriate classification techniques
C313.5	Classify the high dimensional data for better organization of the data
C313.6	Evaluate various mining techniques on complex data objects

Course Name**: DESIGN PATTERNS** **C314** **Course Year: 2017-18**

C314.1	Analyze the underlying object-oriented principles of design patterns.
C314.2	Analyze the patterns with each other and overall quality of a system
C314.3	Discuss the context in which the pattern can be applied
C314.4	Analyze the type of the pattern and applying the pattern on problem solving.
C314.5	Design patterns and providing solutions to real world software design problems.
C314.6	Analyze how the application of a pattern affects the system quality and its tradeoffs

Course Name:**DESIGN AND ANALYSIS OF ALGORITHMS** **C315** **Course Year: 2017-18**

C315.1	Analyze the concept of pseudo-code for writing an algorithm and the asymptotic performance of various algorithms
C315.2	Apply divide and conquer techniques to solve the problems
C315.3	Apply the methods of Greedy approach & Dynamic programming to solve various problems.
C315.4	Apply the concept of trees and graphs in various problems
C315.5	Construct efficient algorithm for designing paradigms of backtracking and Branch & Bound in solving problems.
C315.6	Analyze variations among tractable and intractable problems which are able to classify P and NP classes.

Course Name: **WEB AND INTERNET TECHNOLOGIES C316** **Course Year: 2017-18**

C316.1	Build dynamic webpage by the use of HTML, XHTML, CSS, XML, XSLT, Javascript, DOM.
C316.2	Develop well – formed / valid XML document.
C316.3	Design java program to connect DBMS and perform insert,update and delete operations on DBMS table.
C316.4	Develop server side java application called Servlet to catch form data sent from client, process it

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	and store it on database.
C316.5	Develop server side java application called JSP to catch form data sent from client and store it on database.
C316.6	Construct rich client presentation using AJAX.

Course Name: **INTELLECTUAL PROPERTY RIGHTS C320 Course Year: 2017-18**

C320.1	Analyze various types of Intellectual Properties (IPs) and its importance
C320.2	Discuss the crucial role of IP in international agencies or treaties
C320.3	Analyze the purpose and functions of trademarks, selecting and evaluating trademarks and its registration process as a protectable matter.
C320.4	Analyze the fundamentals of copyright laws & patent law rights
C320.5	Analyze the trade secrets law and litigations along with false advertising under unfair competition.
C320.6	Apply the new developments occurred in trade mark law, copy right law and patent right laws happened internationally.

Course Name:**WEB AND INTERNET TECHNOLOGIESLABORATORYC321 Course Year: 2017-18**

C321.1	Develop dynamic and interactive web sites
C321.2	Apply client side scripting using java script & DHTML
C321.3	Discuss HTML, XML, XSTL, CSS
C321.4	Apply server side scripting using java servelets, JSP, and PHP
C321.5	Analyze regular expressions
C321.6	Apply DTD to a library

Course Name:**DATA WAREHOUSING & MINING LABORATORYC322 Course Year: 2017-18**

C322.1	Build data warehouse & explore WEKA
C322.2	Apply pre-processing tasks
C322.3	Apply association mining rules on data set
C322.4	Apply classification, clustering and regression on data sets
C322.5	Apply data mining algorithms on data sets
C322.6	Analyze schemas of data warehouse.

Course Name:**ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY (AUDIT COURSE)**
C323 Course Year: 2017-18

C323.1	Develop Communication skills
C323.2	Develop Writing skills
C323.3	Develop presentation skills
C323.4	Develop interpersonal skills
C323.5	Develop Job ready skills like Debate, GD, Job Interviews
C323.6	Develop effective speaking activities

IV-I
Course Name:**MANAGEMENT SCIENCE C401 Course Year: 2018-19**

C401.1	Explain the concepts of management, organization and administration, functions and evolutions of management thoughts.
C401.2	Analyze the types of organization structures-merits and demerits
C401.3	Interpret the differences between plant layout and location, work study and function,Productivity and production, statistical quality control
C401.4	Discuss material management and its role of success in corporate business, marketing concepts and role of marketing in business environment.

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C401.5	Explain the concepts of HRM, HRD, IR.
C401.6	Explain project management and its employment in invested project.

Course Name:**GRID & CLOUD COMPUTING** **C402** **Course Year: 2018-19**

C402.1	Analyze the fundamental principles of distributed computing
C402.2	Interpret various standards used in Grid services for manipulation of data
C402.3	Analyze Globus toolkit for Grid computing applications
C402.4	Analyze the concept of virtualization applied in cloud
C402.5	Apply Hadoop related techniques for cloud computing applications
C402.6	Analyze the issues involved in cloud security

Course Name::**INFORMATION SECURITY** **C403** **Course Year: 2018-19**

C403.1	Classify the symmetric encryption techniques
C403.2	Apply various Public key cryptographic techniques
C403.3	Evaluate the authentication and hash algorithms.
C403.4	Discuss authentication applications
C403.5	Apply the intrusion detection and its solutions to overcome the attacks.
C403.6	Analyze basic concepts of system level security

Course Name:**MOBILE APPLICATION DEVELOPMENT** **C404** **Course Year: 2018-19**

C404.1	Make use of various Android Emulators
C404.2	Create data sharing with different applications and sending and intercepting SMS.
C404.3	Apply basic widgets to construct User Interface
C404.4	Build applications using services and publishing android applications
C404.5	Construct resources & media using android
C404.6	Discuss skills of using Android software development tools

Course Name:**SOFTWARE ARCHITECTURE** **C405 Course Year: 2018-19**

C405.1	Design software architecture for large scale software systems
C405.2	Discuss software architectural styles, design patterns, and frameworks
C405.3	Analyze software architecture using various documentation approaches and architectural
C405.4	Analyze software architecture using Description languages
C405.5	Discuss architectural alternatives for a problem and select among them
C405.6	Make use of well-understood paradigms for designing new systems

Course Name:**SOFTWARE PROJECT MANAGEMENTC408 Course Year: 2018-19**

C408.1	Determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
C408.2	Compare and differentiate organization structures and project structures
C408.3	Design project to manage project schedule, expenses and resources with the application of suitable project management tools
C408.4	Identify the different project contexts and suggest an appropriate management strategy
C408.5	Analyze the role of professional ethics in successful software development
C408.6	Identify and describe the key phases of project management

Course Name:**GRID & CLOUD COMPUTING LABORATORYC411 Course Year: 2018-19**

C411.1	Build Grid Computing Programs Using GridSim
C411.2	Build Grid Computing Programs Using Globus Tool Kit
C411.3	Experiment with SaaS Programs Using Zoho Cloud

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C411.4	Experiment with SaaS Programs Using docs.google.com(googledocs)
C411.5	Build PaaS Programs Using google AppEngine and Microsoft azure
C411.6	Analyze Case Study On Cloud Computing

Course Name:**MOBILE APPLICATION DEVELOPMENT LABORATORY C412 Course Year: 2018-19**

C412.1	Analyze data sharing with different applications and sending and intercepting SMS
C412.2	Develop applications using services and publishing android applications.
C412.3	Discuss skills of using Android software development tools
C412.4	Develop different layouts in android
C412.5	Design User Interface using controls & menus
C412.6	Make use of data storing facility in android

IV-II

Course Name:**MOBILE COMPUTING C414 Course Year: 2018-19**

C414.1	Discuss concepts of Mobile Communication
C414.2	Analyze next generation Mobile Communication System
C414.3	Analyze network and transport layers of Mobile Communication
C414.4	Analyze various protocols of all layers for mobile and ad hoc wireless communication networks
C414.5	Discuss IP and TCP layers of Mobile Communication
C414.6	Analyze the wireless sensor network techniques to implement with real time examples

Course Name:**ENABLING TECHNOLOGIES FOR DATA SCIENCE & ANALYTICS: IOT C417 Course Year: 2018-19**

C417.1	Explain the application areas of IoT
C417.2	Analyze the revolution of Internet in Mobile Devices,Cloud & Sensor Networks
C417.3	Develop Internet of Things
C417.4	Describe various case studies of IOT
C417.5	Discuss family of protocols
C417.6	Build the building blocks of Internet of Things and characteristics

Course Name:**TECHNICAL SEMINAR C420 Course Year: 2018-19**

C420.1	Build the skills to do literature survey
C420.2	Build the skills to perform paper presentation.
C420.3	Develop technical seminar presentation and report based on current trends.
C420.4	Develop better communication skills.
C420.5	Construct the final report.
C420.6	Develop interview skills.

Course Name:**PROJECT WORK C421 Course Year: 2018-19**

C421.1	Analyze different software process models and software engineering principles in real life problems.
C421.2	Identify computing requirements to solve the problem.
C421.3	Analyze software project using different algorithms to meet the requirements.
C421.4	Design computer-based program using different languages like Java, Python.
C421.5	Build the ability to communicate with the stakeholder.
C421.6	Develop Software Requirement Specification, Design document and Test cases for related project.

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Department Of Computer Science And Engineering
Course Outcomes - R13 Regulation

Course Name:**COMMUNICATIVE ENGLISH** **C101** **Course Year: 2013-14**

C101.1	Familiarize with the listening techniques, introducing oneself during formal and informal situations, reading and writing strategies
C101.2	Realize the importance of listening to details, apologizing, requesting along with note making strategies
C101.3	Develop the ability to give instructions and directions, make suggestions along with accepting ideas and also prepare a resume with a cover letter
C101.4	Narrate stories along with expressing ideas and also develop the skills of writing a technical report
C101.5	Give presentations and participate actively in group discussions and also listen actively to various speeches
C101.6	Read for getting information along with developing the ability to draft an e-mail

Course Name: **ENGINEERING PHYSICS** **C102** **Course Year: 2013-14**

C102.1	Understand the physical optics, lasers and fiber optics involving Newton's rings, Fraun Hofer diffraction, population inversion, ruby laser, Numerical aperture and acceptance angle
C102.2	Analyze the concept of crystallography and ultrasonic which include Bravias lattice, Bragg's law, production of ultrasonic by piezoelectric method
C102.3	Outline the quantum mechanics which involves De 'Broglie hypothesis, Heisenberg's uncertainty principle along with their Eigen values and functions
C102.4	Interpret the free electron theory along with equation of electrical conductivity and classification of solids
C102.5	Realize the concepts of semiconductors and magnetic materials through Hall effect, Bohr Magnetron
C102.6	Summarize the properties of superconductors along with their applications and also understand the physics of Nanomaterial

Course Name: **ENGINEERING CHEMISTRY** **C103** **Course Year: 2013-14**

C103.1	Carry out a detailed review on the electrochemical cells, electrochemical sensors and the process of corrosion
C103.2	Understand the various characteristics of polymers along with conducting polymers and inorganic polymers
C103.3	Analyze the classification of fuels along with their characteristics and calorific value involving solid fuels
C103.4	Interpret various liquid and gaseous fuels along with their process of origin, properties, advantages and disadvantages
C103.5	Summarize the underlying chemistry of engineering materials involving refractories, lubricants and rocket propellants
C103.6	Understand the various procedures involved in the treatment of water involving industrial use of water and treatment of boiler feed water

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Course Name: **MATHEMATICS – I** **C104** **Course Year: 2013-14**

C104.1	Understand the Exact, linear and Bernoulli equations along with applications to Newton's law of cooling
C104.2	Analyze the non-homogeneous linear differential equations of second and higher order along with deflection of beams and whirling of shafts
C104.3	Estimate the Taylors and Malaren series involving Maxima and minima of functions involving 2 variables along with radius of curvature
C104.4	Understand the concept of curve tracing and also multiple integrals
C104.5	Perform the Laplace transform of standard functions along with inverse transformation, differentiation and integration of transform
C104.6	Analyze the vector calculus involving divergence, curl, green's theorem, Stake's and Gauss theorems

Course Name: **PROBLEM SOLVING & COMPUTER PROGRAMMING C105 Course Year: 2013-14**

C105.1	Enumerate the introductory concepts about a computer along with the introduction to computer problem solving
C105.2	Understand the basic concepts of C Programming along with the operators, expressions and fundamental algorithms
C105.3	Analyze the procedure to provide input and acquire output from the program along with implementation of control statements and functions
C105.4	Perform the techniques of merging, sorting and searching along with the concepts of arrays and strings
C105.5	Interpret the concepts of pointers in programming and also analyze the concepts of structures, unions and file handling functions
C105.6	Write programs employing stacks and queues along with linked lists and evaluation of expressions

Course Name: **MATHEMATICS - II** **C106** **Course Year: 2013-14**

C106.1	Analyze various mathematical techniques like fourier series,fourier and z-Transforms
C106.2	Apply the knowledge of algebraic equations to solve real time problems
C106.3	Implement the knowledge gained to tackle the engineering problems using the concept of partial differential equations
C106.4	Apply the knowledge of numerical methods to solve engineering problems
C106.5	Recognize the problem statement and solve the integral theorems
C106.6	Compare various variables used in different one-Dimensional and two-Dimensional equations

Course Name:**BASIC ELECTRICAL & ELECTRONICS ENGINEERING C107 Course Year: 2013-14**

C107.1	Compare and contrast different networks
C107.2	Apply the knowledge of network fundamentals to solve networks theorems
C107.3	Understand the operating principles of various rotating machines
C107.4	Remember the various characteristics of semi-conductor devices
C107.5	Generalize the features of kinds of transistors and their applications
C107.6	Distinguish between oscillators and operational amplifliers

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Course Name: **COMPUTER PROGRAMMING LAB** **C108** **Course Year: 2013-14**

C108.1	Develop program for performing addition, Fibonacci sequence, generation of prime number and calculation of roots of quadratic equation
C108.2	Write a program for recursive and non-recursive functions, employing switch statements, palindrome evaluation, counting of words and Pascal'striangle
C108.3	Generate program for geometric progression, binary evaluation, operations on complex numbers, merging of files
C108.4	Implement programs involving operations on arrays, pointers, linked lists and various stack operations
C108.5	Perform bubble sort, selection sort , merge sort along with various searching methods like linear search and binary search
C108.6	Write a program implementing LaGrange interpolation, Newton-Gregory forward interpolation, linear and polynomial regression along with trapezoidal and Simpson methods

Course Name: **ENGINEERING PHYSICS & ENGINEERING CHEMISTRY LAB** **C109**
Course Year: 2013-14

C109.1	Determine wavelength of various colors of mercury, dispersive power of prism and thickness of thin object
C109.2	Analyze the radius of curvature of lens by Newton's rings, determination of wavelength by diffraction grafting and numerical aperture of optical fiber
C109.3	Perform Medes experiment along with verification of 3 laws of stretched strings, energy gap of p-n junction diode and Stewart and Gee's method
C109.4	Determine the hardness of water and copper by EDTA method along with estimation of dissolved oxygen by Winkler's method
C109.5	Analyze the Idometry test, Dichrometry test along with determination of acidity and alkalinity of water
C109.6	Calculate the viscosity of oils through Redwood viscometer I and II along with conduction of titration of strong acid versus strong base

Course Name: **ENGINEERING AND IT WORKSHOP** **C110** **Course Year: 2013-14**

C110.1	Obtain the basic knowledge of various tools and their use in different sections of manufacture such as fitting, carpentry, welding
C110.2	Design various models that are involved with plumbing, metal cutting
C110.3	Disassemble and assemble the computer back to working condition and dual boot the computer
C110.4	Comprehend the Internet and different types of productivity tools and perform networking
C110.5	Identify the various tools present in Microsoft office and gain the ability to use them efficiently during the preparation of document
C110.6	Familiarize with the basic concepts of internet and create accounts in various applications like Facebook, Skype

Course Name: **ENGLISH LANGUAGE COMM SKILLS LAB** **C111** **Course Year: 2013-14**

C111.1	Spell the English vowels and consonant sounds in a correct manner
C111.2	Obtain information on the techniques to be employed during uttering sentences and words
C111.3	Develop his listening skills and also perform various listening activities
C111.4	Participate in various activities like JAM, presenting a topic and thus improve his presentational skills
C111.5	Develop the stage dynamics and also body language which are essential while delivering a presentation
C111.6	Improve upon speaking skills over telephone, role plays and public speaking

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II-I

Course Name: **ENGINEERING GRAPHICS** **C201** **Course Year:2014-15**

C201.1	Analyze the concept of engineering drawing, their significance and practice the curves used in drawing.
C201.2	Apply principles of projections, projection points, lines of planes and to evaluate the projection problems and finding true lengths.
C201.3	Construct projections of regular plane surfaces and Distinguish various types of solid projections with axis inclined to plane.
C201.4	Identify the different section planes and view of right solids with their combinations related to development surfaces.
C201.5	Understand the principles, scale and views of isometric projections.
C201.6	Construct the conventions, spherical parts and differentiate the views of isometric to orthographic projections.

Course Name: **PROBABILITY & STATISTICS** **C202** **Course Year:2014-15**

C202.1	Build basic concepts of probability and statistics and implement in solving practical engineering problems
C202.2	Apply discrete and continuous probability distributions to evaluate the probability of real world problems
C202.3	Construct hypotheses tests concerning population parameters for single and multiple populations based on sample data.
C202.4	Build concepts of t-test f-test and chi-square test for small samples
C202.5	Demonstrate the ability to design, use, and interpret control charts for variables.
C202.6	Demonstrate the knowledge and understand various queuing models

Course Name: **ENVIRONMENTAL SCIENCE** **C203** **Course Year:2014-15**

C203.1	Understand the concept of environmental studies, scope, Importance and awareness of natural resources.
C203.2	Analysing various kinds of ecosystems and understand biodiversity concept and its characteristics.
C203.3	Apply knowledge of various kinds of environmental pollutions and analysing how to manage the solid waste, preventions of pollutions.
C203.4	Evaluating the social issues and how to prevent environment from various effects of pollutions and provide awareness, case studies.
C203.5	Applying various types of methods for human health, environment, welfare, how the technology effect on environment.
C203.6	Create to visit the different places and note various causes and effects of environment.

Course Name: **DATA STRUCTURES** **C204** **Course Year:2014-15**

C204.1	Understand types of data structures and remember system development life cycle process
C204.2	Apply programming skills on linear data structures applications
C204.3	Compare different sorting techniques
C204.4	Construct various types of trees for the given data
C204.5	Differentiate between the concepts of trees and graphs
C204.6	Apply knowledge of linear data structures to solve real time applications

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Course Name: **DIGITAL LOGIC DESIGN** **C205** **Course Year:2014-15**

C205.1	Apply knowledge of Number Systems, Boolean Algebra and Logic Gates to draw a logic circuit for a given Boolean Function.
C205.2	Simplify and solve Boolean Equations by using K-Maps, Boolean Laws and Tabulation method.
C205.3	Construct combinational circuits for a given set of data by using Boolean functions.
C205.4	Construct sequential circuits, registers and counters for a given set of data by using Boolean functions, latches and flip-flops.
C205.5	Construct Programmable Logic devices circuits by using Boolean functions.
C205.6	Compare digital logic families with its characteristics.

Course Name: **DISCRETE MATHEMATICS** **C206** **Course Year:2014-15**

C206.1	Apply the knowledge of Mathematical Logic and Predicate calculus to solve problems
C206.2	Simplify and Solve the practical examples of sets, functions, relations and recurrence relations.
C206.3	Construct different algebraic structures by using concepts of groups, sub groups, monoids and rings
C206.4	Apply the ability to learn the basic concepts about relations, functions and to draw different diagrams like Lattice, Hasse diagrams.
C206.5	Summarize the basic concepts associated with Graphs and Trees.
C206.6	Identify the different counting techniques like permutations and combinations related to mathematics and computer science.

Course Name:**ELECTRICAL & ELECTRONICS ENGINEERING LAB** **C207** **Course Year:2014-15**

C207.1	Analyze and evaluate the superposition, thevinin's theorems
C207.2	Understand the characteristics of D.C shunt generator and evaluate swinburne's test
C207.3	Determine the performance characteristics and evaluate OC & SC tests on single- phase transformers
C207.4	Analyze the characteristic of P-N junction, zener and bipolar CB configurations of diode
C207.5	Build half and full wave rectifiers with and without capacitor filters.
C207.6	Understand and construct CE configuration of bipolar junction, junction filed effect and logic gates.

Course Name: **DATA STRUCTURES LAB** **C208** **Course Year:2014-15**

C208.1	Write programs employing operations of stacks, queues, double linked links and conversion of infix to postfix expression through stack operations.
C208.2	Implement circular queue operations and perform techniques of quick sort, heap sort and merge sort.
C208.3	Analyze binary tree, tree traversals and perform operations for that.
C208.4	Implement graph traversals and all functions of dictionaries by using hashing.
C208.5	Analyze and implement the skip list operations and insertion, deletion, searching operations on SPLAY trees.
C208.6	Build the operations of AVL and B-trees

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II-II

Course Name: **COMPUTER ORGANIZATION &ARCHITECTURE** **C209** **Course Year:2014-15**

C209.1	Analyze various internal stages of a modern computer
C209.2	Compare instructions of basic computer along with their addressing modes
C209.3	Analyze the computer algorithms for arithmetic operations
C209.4	Design computer memory hierarchy based on speed and cost
C209.5	Build Interface I/O devices to a computer to transfer data among various I/O sources
C209.6	Relate the concepts of different pipelining techniques and interprets the concepts of multiprocessor architectures.

Course Name:**DATABASE MANAGEMENT SYSTEMS** **C210** **Course Year:2014-15**

C210.1	Design a database using the principles of an appropriate data model
C210.2	Apply relational algebra operations, tuple and domain relational calculus for information processing
C210.3	Apply SQL queries to create a simple database
C210.4	Apply normalization techniques to improve database design
C210.5	Apply and relate the concept of transaction processing, concurrency control and recovery in database.
C210.6	Apply the concepts of different data storage and access methods

Course Name: **JAVA PROGRAMMING** **C211Course Year:2014-15**

C211.1	Solve object oriented problems using Java language.
C211.2	Construct efficient multitasking programs with exceptions handling.
C211.3	Design various applets for internet applications
C211.4	Create user friendly interface GUI by using AWT
C211.5	Construct class reusability process by using inheritance
C211.6	Design menu driven programs for web based applications.

Course Name: **FORMAL LANGUAGES & AUTOMATA THEORY** **C212** **Course Year:2014-15**

C212.1	Understand the basic concepts of formal languages.
C212.2	Analyze various types of finite automata.
C212.3	Understand regular expressions, various theorems, properties, applications and Construct the regular grammars.
C212.4	Analyze context free grammar and context free languages
C212.5	Analyze pushdown automata and its role in languages
C212.6	Understand the concept of turing machine and analyze the properties, functionalities of turing machine

Course Name:**PRINCIPLES OF PROGRAMMING LANGUAGES** **C213Course Year:2014-15**

C213.1	Analyze the concepts of various programming languages and its paradigms.
C213.2	Identify the features of attribute grammars and draw parse trees.
C213.3	Construct different parameter passing techniques of different programming languages by selecting various data types.
C213.4	Apply the concepts of object oriented programming in C++, Ada95, PROLOG, and Smalltalk.
C213.5	Analyze the concepts of semaphores, monitors, message passing.
C213.6	Analyze functional programming languages and scripting languages.

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Course Name: **DESIGN AND ANALYSIS OF ALGORITHMS C214 Course Year:2014-15**

C214.1	Analyze the concept of pseudo-code for writing an algorithm and the asymptotic performance of various algorithms
C214.2	Apply divide and conquer techniques to solve the problems
C214.3	Apply the methods of Greedy approach & Dynamic programming to solve various problems.
C214.4	Apply the concept of trees and graphs in various problems
C214.5	Construct efficient algorithm for designing paradigms of backtracking and Branch & Bound in solving problems.
C214.6	Analyze variations among tractable and intractable problems which are able to classify P and NP classes.

Course Name: **DATABASE MANAGEMENT SYSTEMS LAB C215 Course Year:2014-15**

C215.1	Apply the basic concepts of Database Management System and its Applications.
C215.2	Design a data model using ER model for a given problem-domain
C215.3	Apply SQL queries to store, process and retrieve information
C215.4	Create a database schema for a given problem-domain
C215.5	Create views on a database.
C215.6	Apply PL/SQL concepts for data access and manipulation

Course Name: **JAVA PROGRAMMING LAB C216 Course Year:2014-15**

C216.1	Install and Understand the eclipse or net beans environment for java. Implement basic quadratic equation, sorting and string have to display count of various types of data.
C216.2	Analyze math.random package and solve problems about string handling operations and inheritance.
C216.3	Solve problems using multithreading, Exceptions and Applets
C216.4	Programs to analyze swing menus and mouse events.
C216.5	Build and solve the problems using Swings
C216.6	Design UI applications using Mouse events, Simple calculators and establish JDBC connection

Course Name:**HUMAN VALUES AND PROFESSIONAL ETHICS C217 Course Year: 2014-15**

C217.1	Understand engineering ethics, variety of moral issues and various theories.
C217.2	Evaluate the social experiments and analyze research, code ethics and standards with case study.
C217.3	Applying the safety and various risks with case studies.
C217.4	Discuss responsibilities, conflicts and rights
C217.5	Analyze business, environmental, computer ethics and understand the role in technical development
C217.6	Discuss issues about engineers, advisors and leadership morals.

III-I

Course Name:**OPERATING SYSTEMS C301 Course Year: 2015-16**

C301.1	Discuss computer system resources and the role of operating system in their management policies and algorithms.
C301.2	Analyze the process management policies and scheduling of processes by CPU
C301.3	Evaluate the requirement for process synchronization and coordination handled by operating system.
C301.4	Analyze the memory management and its allocation policies.
C301.5	Discuss the storage management policies with respect to different storage management technologies.
C301.6	Discuss the special purpose operating system.

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Course Name:**COMPILER DESIGN** **C302** **Course Year: 2015-16**

C302.1	Analyze the phases of compiler with the steps involved in it.
C302.2	Analyze the role of lexical analysis using LEX tool by applying pattern matching primitives.
C302.3	Apply top-down and bottom-up parsing techniques for a given grammar.
C302.4	Analyze syntax directed translations schemes and intermediate code generation
C302.5	Analyze storage allocation strategies and symbol table concept
C302.6	Analyze code optimization & code generation phases in compiler

Course Name:**UNIX AND SHELL PROGRAMMING** **C303** **Course Year: 2015-16**

C303.1	Make use of UNIX operating system, editor, file system and its operations, securities.
C303.2	Develop basic shell programs, filters, pipes and files.
C303.3	Analyze and apply user communications, atoms and operators.
C303.4	Build and analyze interactive korn shell and shell programming
C303.5	Analyze interactive C shell.
C303.6	Develop basic C shell programming, validate and Debugging.

Course Name:**SOFTWARE ENGINEERING** **C304** **Course Year: 2015-16**

C304.1	Develop a software project from requirements to implementation.
C304.2	Build Software requirements, Life cycle Model and SRS document.
C304.3	Illustrate the importance of modeling and modeling languages.
C304.4	Compare the quality control and how to ensure good quality software.
C304.5	Develop to code and test the software.
C304.6	Organize to plan, Estimate and Maintain software systems.

Course Name:**MICROPROCESSORS& INTERFACING** **C305** **Course Year: 2015-16**

C305.1	Compare the architectures of 8bit & 16bit intel microprocessors
C305.2	Develop 8086 assembly language programs with different addressing mode instructions
C305.3	Design memory interfacing to 8086 microprocessor
C305.4	Design I/O and Timer interfacing to 8086 microprocessor and to develop assembly language programs
C305.5	Build interface USART, PIC and DMA controllers to 8086 microprocessor
C305.6	Design simple real time applications using 8051 microcontroller.

Course Name:**MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS** **C306** **Course Year: 2015-16**

C306.1	Analyze the scope of managerial economics to attain optimal decisions by considering managerial tools and techniques.
C306.2	Analyze the concept of elasticity of demand, its types and measurement along with demand forecasting methods.
C306.3	Analyze the functions of production concept, factors of technical relationships which impacts various costs on production to get maximum profits.
C306.4	Analyze the changing business environment in post liberalization scenario, to know types of markets and how firms determine their production levels in different competitive situations.
C306.5	Apply how business will maintain accounting books and financial position of the business in the market and its cycle.
C306.6	Apply various capital budgeting methods to take decisions towards investment proposals and projects.

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Course Name:**OPERATING SYSTEMS LAB** **C307** **Course Year: 2015-16**

C307.1	Understand the Linux OS basics command, scripts for files and implement scripts for files.
C307.2	Build c file home directories, shell script for file arguments, functions and grep command
C307.3	Implement enhancing options of file, build awk script for counting things in a file.
C307.4	Implement c program for pipelining, sender, receiver, client and server programming
C307.5	Implement CPU scheduling algorithms, file allocation and file organizing techniques.
C307.6	Build bankers algorithms for deadlock avoidance, prevention, page replacement algorithms and paging.

Course Name:**COMPILER DESIGN AND ASSEMBLY LANGUAGE PROGRAMMING LAB** **C308**
Course Year: 2015-16

C308.1	Implement in Linux environment grep, fgrep, DFA, NFA, regular expressions and files
C308.2	Build programs for PDA and lexical analyzer.
C308.3	Implement the programs for grammars.
C308.4	Build programs for YACC
C308.5	Implement ALP program and basic programs for 8086
C308.6	Build programs on numbers in assembly language.

Course Name:**ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS LAB** **C309**
Course Year: 2015-16

C309.1	Develop Communication skills
C309.2	Develop Writing skills
C309.3	Develop presentation skills
C309.4	Develop interpersonal skills
C309.5	Develop Job ready skills like Debate, GD, Job Interviews
C309.6	Develop effective speaking activities

III-II

Course Name:**COMPUTER NETWORKS** **C310** **Course Year: 2015-16**

C310.1	Choose the transmission media depending on the requirements.
C310.2	Design computer network logically.
C310.3	Analyze OSI Reference Model and in particular have a good knowledge of Layers
C310.4	Classify the routing protocols and analyze how to assign the IP addresses for the given network.
C310.5	Explain the functions of each layer in OSI and TCP/IP model.
C310.6	Design new protocols for computer network.

Course Name:**OBJECT ORIENTED ANALYSIS, DESIGN AND MODELING** **C311**
Course Year: 2015-16

C311.1	Analyze the structure of complex systems
C311.2	Design the Conceptual model of UML and SDLC
C311.3	Analyze classes and relationships
C311.4	Discuss various classes modelling techniques and instances modelling techniques
C311.5	Explain interaction diagrams and their modelling techniques
C311.6	Analyze events and signals and their modelling techniques

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Course Name:**DATA MINING** **C312** **Course Year: 2015-16**

C312.1	Design a data warehouse with dimensional modeling and apply OLAP operations.
C312.2	Analyze basic concepts, decision trees and evaluate classification models
C312.3	Design and deploy appropriate classification techniques
C312.4	Analyze association and various algorithms of association techniques apply
C312.5	Understand cluster analysis and its basic algorithms
C312.6	Evaluate various issues and various algorithm approaches of cluster analysis

Course Name:**WEB TECHNOLOGIES** **C313** **Course Year: 2015-16**

C313.1	Understand the basic concepts of web, client and server side programming
C313.2	Build dynamic webpage by the use of HTML and CSS.
C313.3	Build dynamic webpage by the use of Java Script.
C313.4	Develop server side programming using CGI.
C313.5	Develop server side java application using JSP, servlets to catch form data sent from client and store it on database.
C313.6	Develop server side java application using java beans and its frameworks to catch form data sent from client and store it on database.

Course Name:**SOFTWARE TESTING METHODOLOGIES** **C314** **Course Year: 2015-16**

C314.1	Develop test models to analyze consequences of bugs.
C314.2	Analyze path testing by using flow graphs and regular expressions.
C314.3	Analyze transaction flow, data flow and domain testing.
C314.4	Analyze logic based & Transition Testing by using decision tables and KV graphs.
C314.5	Illustrate graph based testing process by using good and bad state graphs and testability tips.
C314.6	Apply node reduction algorithm to find out reduced adjacency matrix

Course Name:**CLOUD COMPUTING** **C316** **Course Year: 2015-16**

C316.1	Analyze system modeling, clustering and virtualization.
C316.2	Analyze the fundamental principles of cloud computing.
C316.3	Discuss infrastructure, platform and software as a service.
C316.4	Analyze the storage of data in cloud.
C316.5	Analyze monitoring, management and applications of clod computing
C316.6	Discuss the concept of cloud security and case study

Course Name:**UNIFIED MODELING LANGUAGE AND TESTINGLAB** **C318** **CourseYear: 2015-16**

C318.1	Design UML structural diagrams for various applications.
C318.2	Design UML behavioral diagrams for various applications.
C318.3	Solve various C programs on decision making and looping
C318.4	Develop various C programs and Introspect for causes of failure.
C318.5	Design test cases and generate reports for software systems
C318.6	Make use of win runner tool to run an application

Course Name:**WEB TECHNOLOGIES &DATAMINING LAB** **C319** **Course Year: 2015-16**

C319.1	Ability to design webpages, websitesand do client side validations
C319.2	Able to share information over a network
C319.3	Able to write server side programs
C319.4	Able to perform data preprocessing tasks and demonstrate performing association rule mining on data sets
C319.5	Able to perform classification, clustering and regression on data sets

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C319.6	Able to design data mining algorithms

IV-I

Course Name:**SOFTWARE ARCHITECTURE & DESIGN PATTERNS C401 CourseYear: 2016-17**

C401.1	Know Concepts, Principles, Techniques and methods for design, analysis and maintenance of software architectures
C401.2	Remember various Architectural Styles
C401.3	Know the underlying object-oriented principles of design patterns
C401.4	Understand the context in which the pattern can be applied to code
C401.5	Understand how the application of a pattern affects the system quality and its tradeoffs
C401.6	Know the maintenance of applications after applying patterns

Course Name:**CRYPTOGRAPHY AND NETWORK SECURITY C402 Course Year: 2016-17**

C402.1	Understand the types of attacks and security mechanisms involved in Networks
C402.2	Analyze the importance of Number theory in the development of security algorithms
C402.3	Understand the cryptographic algorithms, network security issues
C402.4	Evaluatethe performance of network parameters.
C402.5	Analyze various authentication mechanisms
C402.6	Compare and contrast the security services at different levels of network

Course Name:**MOBILE APPLICATION DEVELOPMENT C403 Course Year: 2016-17**

C403.1	Make use of various Android Emulators
C403.2	Create data sharing with different applications and sending and intercepting SMS.
C403.3	Apply basic widgets to construct User Interface
C403.4	Build applications using services and publishing android applications
C403.5	Construct resources & media using Android
C403.6	Discuss skills of using Android software development tools

Course Name:**MANAGEMENT SCIENCE C404 Course Year: 2016-17**

C404.1	Explain the concepts of management, organization and administration, functions and evolutions of management thoughts.
C404.2	Analyze the types of organization structures-merits and demerits
C404.3	Interpret the differences between plant layout and location, work study and function, Productivity and production, statistical quality control
C404.4	Discuss material management and its role of success in corporate business, marketing concepts and role of marketing in business environment.
C404.5	Explain the concepts of HRM, HRD, IR.
C404.6	Explain project management and its employment in invested project.

Course Name: **HUMAN COMPUTER INTERACTION C405 Course Year: 2016-17**

C405.1	Understand precedence of user interfaces and GUI.
C405.2	Build the user interface with web and understand how to design the interaction with user
C405.3	Understand goals, elements, visual information and how to interfacing the technological information design.
C405.4	Analyze functionalities, structures, contents of graphical menus and build the different kinds of window and its management
C405.5	Discuss different controls of and characteristics of computer interaction
C405.6	Analyze how to apply graphics and how to apply different kinds of tests for your model.

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Course Name:**INFORMATION RETRIEVAL SYSTEMS** **C409** **Course Year: 2016-17**

C409.1	Understand different kind of strategies for retrieving of information.
C409.2	Analyze various kinds of utilities about information retrieval
C409.3	Understand the basics of cross language.
C409.4	Build the ability of information retrieval system.
C409.5	Analyze how to merge framed data using relational schema.
C409.6	Analyze how to distribute the information retrieving.

Course Name:**COMPUTER NETWORKS AND NETWORK SECURITY LAB C411**
Course Year:2016-17

C411.1	Understand the fundamental specifications of network facilities of college.
C411.2	Implement different algorithms for error corrections.
C411.3	Implement routing algorithms and understand any simulator and generate report for that.
C411.4	Understand the cryptographic algorithms, network security issues and implement it in C or C++, web server communication.
C411.5	Analyze performance, evaluation of cryptographic algorithms, IPTABLES, configuring S/MIME for e-mail communication.
C411.6	Understand and implement buffer overflow and format string attacks, NMAP for ports monitoring, proxy based security protocols in C or C++ with features.

Course Name:**MOBILE APPLICATION DEVELOPMENT LAB C412 Course Year: 2016-17**

C412.1	Understand the use of GUI Components
C412.2	Develop application using different layouts
C412.3	Design and develop a calculator application
C412.4	Design and implement various mobile applications using emulators.
C412.5	Deploy applications to hand-held devices
C412.6	Understand and implement database connectivity

IV-II
Course Name: Mobile Computing C413 Course Year:2016-17

C413.1	Know the fundamentals of wireless networks and classes of wireless networks
C413.2	Memorize the concepts of ad hoc networks and various MAC Protocols
C413.3	Analyze performance, evaluation of various Routing Protocols in AWN
C413.4	Understand the importance of QoS in Ad hoc Wireless Networks
C413.5	Know the fundamentals of WSN and its Architecture.
C413.6	Acquire skills to design and implement a basic mobile ad hoc or wireless sensor network via simulations.

Course Name: **Real Time Systems** **C416** **Course Year: 2016-17**

C416.1	Characterize real-time systems and describe their functions
C416.2	Analyze, design and implement a real-time system
C416.3	Apply formal methods to the analysis and design of real-time systems
C416.4	Apply formal methods for scheduling real-time systems
C416.5	Analyze the functionality of Dynamic Multiprocessor Systems
C416.6	Characterize and describe reliability and fault tolerance issues and approaches.

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Course Name:**Programming for Everybody using Python** **C418** **Course Year: 2016-17**

C418.1	Discuss software architectural styles, design patterns, and frameworks
C418.2	Analyze various techniques about sharing.
C418.3	Analyze design patterns and build design patterns.
C418.4	Analyze and create structural patterns.
C418.5	Discuss Behavioral patterns.
C418.6	Design a pattern using all the rules and specifications for a case study.

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DEPARTMENT OF ELCTRONICS & COMMUNICATION ENGINEERING

Department Of Electronics and Communication Engineering
Course Outcomes - R13 Regulation

Course Name: **ENGLISH** **C101** **Course Year: 2013-14**

C101.1	Familiarize with the listening techniques, introducing oneself during formal and informal situations, reading and writing strategies
C101.2	Realize the importance of listening to details, apologizing, requesting along with note making strategies
C101.3	Develop the ability to give instructions and directions, make suggestions along with accepting ideas and also prepare a resume with a cover letter
C101.4	Narrate stories along with expressing ideas and also develop the skills of writing a technical report
C101.5	Give presentations and participate actively in group discussions and also listen actively to various speeches
C101.6	Read for getting information along with developing the ability to draft an e-mail

Course Name: **ENGINEERING PHYSICS** **C102** **Course Year: 2013-14**

C102.1	Understand the physical optics, lasers and fiber optics involving Newton's rings, Fraun Hofer diffraction, population inversion, ruby laser, Numerical aperture and acceptance angle
C102.2	Analyze the concept of crystallography and ultrasonic which include Bravias lattice, Bragg's law, production of ultrasonic by piezoelectric method
C102.3	Outline the quantum mechanics which involves De 'Broglie hypothesis, Heisenberg's uncertainty principle along with their Eigen values and functions
C102.4	Interpret the free electron theory along with equation of electrical conductivity and classification of solids
C102.5	Realize the concepts of semiconductors and magnetic materials through Hall effect, Bohr Magnetron
C102.6	Summarize the properties of superconductors along with their applications and also understand the physics of Nanomaterial

Course Name: **ENGINEERING CHEMISTRY** **C103** **Course Year: 2013-14**

C103.1	Carry out a detailed review on the electrochemical cells, electrochemical sensors and the process of corrosion
C103.2	Understand the various characteristics of polymers along with conducting polymers and inorganic polymers
C103.3	Analyze the classification of fuels along with their characteristics and calorific value involving solid fuels
C103.4	Interpret various liquid and gaseous fuels along with their process of origin, properties, advantages and disadvantages
C103.5	Summarize the underlying chemistry of engineering materials involving refractories, lubricants and rocket propellants
C103.6	Understand the various procedures involved in the treatment of water involving industrial use of water and treatment of boiler feed water

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DEPARTMENT OF ELCTRONICS & COMMUNICATION ENGINEERING

Course Name: **MATHEMATICS – I** **C104** **Course Year: 2013-14**

C104.1	Understand the Exact, linear and Bernoulli equations along with applications to Newton's law of cooling
C104.2	Analyze the non-homogeneous linear differential equations of second and higher order along with deflection of beams and whirling of shafts
C104.3	Estimate the Taylors and Malaren series involving Maxima and minima of functions involving 2 variables along with radius of curvature
C104.4	Understand the concept of curve tracing and also multiple integrals
C104.5	Perform the Laplace transform of standard functions along with inverse transformation, differentiation and integration of transform
C104.6	Analyze the vector calculus involving divergence, curl, green's theorem, Stake's and Gauss theorems

Course Name: **PROGRAMMING IN C &DATA STRUCTURES** **C105** **Course Year: 2013-14**

C105.1	Enumerate the introductory concepts about a computer along with the introduction to computer problem solving
C105.2	Understand the basic concepts of C Programming along with the operators, expressions and fundamental algorithms
C105.3	Analyze the procedure to provide input and acquire output from the program along with implementation of control statements and functions
C105.4	Perform the techniques of merging, sorting and searching along with the concepts of arrays and strings
C105.5	Interpret the concepts of pointers in programming and also analyze the concepts of structures, unions and file handling functions
C105.6	Write programs employing stacks and queues along with linked lists and evaluation of expressions

Course Name: **MATHEMATICAL METHODS** **C106** **Course Year: 2013-14**

C106.1	Analyze the concept of matrices and evaluate the various operations to be done on matrices
C106.2	Perform the solution of algebraic and transcendental equations employing bisection method, false position and Newton-Rapson method
C106.3	Understand the technique of interpolation along with LaGrange's formula and also the concept of curve fitting
C106.4	Interpret the numerical solution of ordinary differential equations employing Taylor series, Runga-kutta method and also the implementation of Fourier series
C106.5	Analyze the technique of Z-transformation for various conditions along with analysis of Fourier transforms
C106.6	Write programs employing stacks and queues along with linked lists and evaluation of expressions

Course Name: **C PROGRAMMING & DATA STRUCTURES LAB** **C107** **Course Year: 2013-14**

C107.1	Develop program for performing addition, Fibonacci sequence, generation of prime number and calculation of roots of quadratic equation
C107.2	Write a program for recursive and non-recursive functions, employing switch statements, palindrome evaluation, counting of words and Pascal'striangle
C107.3	Generate program for geometric progression, binary evaluation, operations on complex numbers, merging of files
C107.4	Implement programs involving operations on arrays, pointers, linked lists and various stack operations

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C107.5	Perform bubble sort, selection sort , merge sort along with various searching methods like linear search and binary search
C107.6	Write a program implementing LaGrange interpolation, Newton-Gregory forward interpolation, linear and polynomial regression along with trapezoidal and Simpson methods

Course Name: **ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LAB** **C108**

Course Year: 2013-14

C108.1	Determine wavelength of various colors of mercury, dispersive power of prism and thickness of thin object
C108.2	Analyze the radius of curvature of lens by Newton's rings, determination of wavelength by diffraction grafting and numerical aperture of optical fiber
C108.3	Perform Medes experiment along with verification of 3 laws of stretched strings, energy gap of p-n junction diode and Stewart and Gee's method
C108.4	Determine the hardness of water and copper by EDTA method along with estimation of dissolved oxygen by Winkler's method
C108.5	Analyze the Idometry test, Dichrometry test along with determination of acidity and alkalinity of water
C108.6	Calculate the viscosity of oils through Redwood viscometer I and II along with conduction of titration of strong acid versus strong base

Course Name: **ENGINEERING & I.T. WORKSHOP** **C109** **Course Year: 2013-14**

C109.1	Obtain the basic knowledge of various tools and their use in different sections of manufacture such as fitting, carpentry, welding
C109.2	Design various models that are involved with plumbing, metal cutting
C109.3	Disassemble and assemble the computer back to working condition and dual boot the computer
C109.4	Comprehend the Internet and different types of productivity tools and perform networking
C109.5	Identify the various tools present in Microsoft office and gain the ability to use them efficiently during the preparation of document
C109.6	Familiarize with the basic concepts of internet and create accounts in various applications like Facebook, Skype

Course Name: **ENGLISH LANGUAGE COMMUNICATION SKILLS LAB** **C110**

Course Year: 2013-14

C110.1	Spell the English vowels and consonant sounds in a correct manner
C110.2	Obtain information on the techniques to be employed during uttering sentences and words
C110.3	Develop his listening skills and also perform various listening activities
C110.4	Participate in various activities like JAM, presenting a topic and thus improve his presentational skills
C110.5	Develop the stage dynamics and also body language which are essential while delivering a presentation
C110.6	Improve upon speaking skills over telephone, role plays and public speaking

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II-I

Course Name: **MATHEMATICS - III** **C201** **Course Year:2014-15**

C201.1	Apply knowledge of mathematics, science and engineering as appropriate to the field of electronics & communication engineering practice.
C201.2	Design and conduct experiments, as well as analyze and interpret the data.
C201.3	Design an electronics & communication system that meets desired specifications and requirements.
C201.4	Analyze effectively in multidisciplinary and multi-cultural teams.
C201.5	Identify, formulate, and solve electronics & communication engineering problems.
C201.6	Understanding of the effects of the engineering solutions in a global, economic, environmental and societal context.

Course Name: **ENVIRONMENTAL SCIENCE** **C202** **Course Year:2014-15**

C202.1	Analyze clear view of structure of the environment.
C202.2	Understand the types of resources present around us.
C202.3	Know the importance of maintaining the quality and also the quantity of Environment.
C202.4	Realize the concept of risk analysis regarding pollutions in different ways.
C202.5	Realize to respect the nature and understand the pain of our mother Earth because of pollution.
C202.6	Defines the concept of sustainability between socio-economics with the environment and able to increase the methods to reduce pollution.

Course Name: **ELECTRICAL CIRCUITS** **C203** **Course Year:2014-15**

C203.1	Analyze the concept of circuits and study different techniques to calculate voltage and current in various networks.
C203.2	Estimate the response of circuits to ac excitation and also understand the concept of resonance
C203.3	Evaluate the concept of network topology through cut sets and tie sets along with the analysis of magnetic circuits.
C203.4	Analyze the evaluation of circuits through thevenins theorem, Norton's theorem, super position theorem and Maximum power transfer theorem.
C203.5	Differentiate the active power and the role of reactive power in a electrical system for single phase circuits
C203.6	Distinguish various types of filters to evaluate critical frequency of operation for low pass and high pass filters.

Course Name: **PROBABILITY THEORY & STOCHASTIC PROCESSES** **C204** **Course Year:2014-15**

C204.1	Recall the basic parameters like probability concepts, principles of random variables and random processes.
C204.2	Apply probability distribution and density functions to evaluate the performance of communication systems in terms of statistical parameters like mean and variance.
C204.3	Describe the characteristics of real, physical world random phenomenon.
C204.4	Evaluate practical probabilistic problems involving random input signals.
C204.5	Illustrates about processes by means of autocorrelation, cross correlation and covariance functions.
C204.6	Describe the performance of systems with random signals & understand the concept of Noise as applicable to linear Systems.

Course Name: **ELECTRONIC DEVICES & CIRCUITS** **C205** **Course Year:2014-15**

C205.1	Understand the theory of operation of semiconductor physics of intrinsic, p & n material characteristics, applications, breakdown mechanisms in semiconductor devices.

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C205.2	Analyze various rectifiers and filter circuits used in regulated power supplies.
C205.3	Compare and contrast the construction, working principles, characteristics and applications of major electronic devices like BJT, FET and MOSFET.
C205.4	Design and analyze the DC bias circuitry of BJT, FET and understand the need to avoid the failure of electronic circuits due to thermal effects.
C205.5	Design and analyze small signal models of BJT, JFET and MOSFET Amplifiers.
C205.6	Formulate electrical model for special semiconductor devices like Tunnel diode, UJT, LDR, LED, Photodiode and learns the practical applications.

Course Name: **SIGNALS & SYSTEMS** **C206** **Course Year:2014-15**

C206.1	Understand the concepts of different signals and systems in continuous &discrete time domains.
C206.2	Find and plot the Fourier series representation of different Periodic signals.
C206.3	Determine the Fourier transform of continuous time signals and verify the sampling theorem for band pass signals.
C206.4	Evaluate the Fourier transform of Discrete-time signals and understand the properties of DTFT.
C206.5	Find the response of LTI&LTV systems and understand the concepts of signal & system bandwidths.
C206.6	Understand the stability of systems through the ROC concept of Laplace and Z-transforms.

Course Name: **ELECTRONIC DEVICES & CIRCUITS LAB C207** **Course Year:2014-15**

C207.1	Find the cut-in voltage, static and dynamic resistances from V-I characteristics of PN junction diode and Zener diode.
C207.2	Compute the ripple content present in half wave and full wave rectifiers with and without filters.
C207.3	Compare and contrast the volt-ampere characteristics of BJT and UJT.
C207.4	Describe the current flow in Field Effect Transistor.
C207.5	Analyze the description of CRO and Function generator panels.
C207.6	Evaluate the Input, output resistance and bandwidth of Common Emitter amplifier using BJT.

Course Name: **BASIC SIMULATION LAB(USING MATLAB) C208** **Course Year:2014-15**

C208.1	Understand the concepts of MATLAB
C208.2	Plot the step, triangular and sinusoidal signals and sequences
C208.3	Perform the convolution of signals and sequences using MATLAB
C208.4	Find the correlation of signals & sequences
C208.5	Verify the linearity, time-invariance and stability of the given systems
C208.6	Generate Gaussian noise, to remove noise by correlation process.

II-II

Course Name: **MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS C209** **Course Year:2014-15**

C209.1	Understand the demand analysis and elasticity of demand
C209.2	Know the production and cost analysis of different commodities
C209.3	Gain the knowledge of monopoly-monopolistic competitions
C209.4	Explain the characteristic features of business and capital budgeting
C209.5	Prepare double-entry book keeping, ledger and trail balance of final accounts
C209.6	Compute financial analysis through current and quick ratio& gross profit ratio.

Course Name: **PRINCIPLES OF ELECTRICAL ENGINEERING C210** **Course Year:2014-15**

C210.1	Analyze the different types of three phase configuration of sources and loads and able to measure the active and reactive powers
C210.2	Study the construction, principle of operation and characteristics of DC motors
C210.3	Investigate the losses, efficiency calculations and applications of DC machines

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C210.4	Study the construction, principle of operation and applications of transformers
C210.5	Analyze principle of operation of three phase induction motor and how it differs from dc motors and single phase motors
C210.6	Study the generation of three phase voltages in Synchronous generators and the constructional features to get pure three phase sinusoidal voltage

Course Name: **ELECTRONIC CIRCUIT ANALYSIS** **C211** **Course Year:2014-15**

C211.1	Distinguish the single stage & multistage amplifiers, Evaluate A_i, R_i, R_o, A_v for CE, CB, CC amplifier circuits Analyze the concept of coupling mechanisms.
C211.2	Analyze the frequency response of single & multi-stage amplifiers using BJTS at high & low frequencies.
C211.3	Understand and Analyze basic analog building blocks for Feedback Amplifiers.
C211.4	Design basic analog building blocks for LC and RC -Oscillator Circuits & analyzing the concept of positive feedback in oscillators.
C211.5	Evaluate the efficiency of Large signal or power amplifiers& analyzes the concept of power amplifiers.
C211.6	Explain the concept of tuned amplifiers &evaluating the resonant frequency for tuned amplifiers.

Course Name: **PULSE & DIGITAL CIRCUITS** **C212** **Course Year:2014-15**

C212.1	Design the linear wave shaping circuits like high pass and low pass RC circuits for various input signals and also acting as Filters.
C212.2	Analyze and design the nonlinear wave shaping circuits like clippers and clampers using diodes and transistors.
C212.3	Illustrate the designing of various switching circuits by using diodes and transistors.
C212.4	Analyze the design of multivibrators that generate various non-sinusoidal signals used for various electronic applications like counters.
C212.5	Evaluate the designing of time base generator circuits which are used in applications like CRO, TV and describes the necessity of synchronization and frequency division in systems operating at different frequencies.
C212.6	Design the various elements like chopper amplifier, sampling scope employing sampling gates and summarize the comparison of all logic gates.

Course Name: **SWITCHING THEORY & LOGIC DESIGN** **C213** **Course Year:2014-15**

C213.1	Defines the basics of a Number system, Conversions, Boolean function and Simplify the logic expressions using Boolean laws and postulates and design them by using logic gates.
C213.2	Minimize the logic expressions using map method and tabular method and implement the Boolean functions using basic gates so as to improve speed of the digital circuit.
C213.3	Demonstrates the concepts and study the procedures for the analysis and design of Combinational circuits.
C213.4	Analyze the concepts and study the procedures for the analysis and design of sequential circuits.
C213.5	Explains the realization of sequential circuits in Counters, Registers and compares with the operation of an arithmetic and logic unit.
C213.6	Categorize the types of PLD's and explains the procedures for the analysis and design of Asynchronous sequential logic circuits.

Course Name: **ELECTROMAGNETIC THEORY & TRANSMISSION LINES** **C214**
Course Year:2014-15

C214.1	Review of coordinate systems. States coulombs law and Gauss's law based on electrostatic fields.
C214.2	Explain about Amperes law in magneto static fields and rewrite the Maxwell equations.
C214.3	Distinguishes the electromagnetic wave equations and study their characteristics propagated in

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	different medias.
C214.4	Analyzes reflection and refraction of electromagnetic waves propagated in normal and oblique incidences
C214.5	Describes the transmission lines with equivalent circuit and explain their characteristic with various lengths.
C214.6	Design and rearranges various parameters of transmission lines using smith chart.

Course Name: **ELECTRONIC CIRCUITS ANALYSIS LAB** **C215** **Course Year:2014-15**

C215.1	Design the single stage amplifiers using BJT to determine the required parameters
C215.2	Analyze the multistage amplifiers to determine its bandwidth.
C215.3	Construct the feedback amplifiers to determine different parameters
C215.4	Design the power amplifiers to calculate its efficiency
C215.5	Evaluate the resonant frequency for oscillator circuits
C215.6	Simulate the single stage and multistage amplifier circuits to determine different parameters

Course Name: **ELECTRICAL ENGINEERING LAB** **C216** **Course Year:2014-15**

C216.1	Perform the verification of theorems like Norton's Theorem, Thevenin's theorem, super position theorem, maximum power transfer theorem along with KVL and KCL experimentally and theoretically
C216.2	Calculate the impedance and admittance parameters along with transmission parameter for a given circuit
C216.3	Depict the magnetization characteristics of D.C shunt generator along with evaluating the critical field resistance and speed
C216.4	Perform Swinburne's test to predetermine the efficiency of the machine as a motor and as a generator
C216.5	Conduct suitable tests on single phase transformer and determine the efficiency, losses and regulation
C216.6	Determine the losses and efficiency of dc motor by conducting brake test until the rated current

III-I

Course Name: **CONTROL SYSTEMS** **C301** **Course Year: 2015-16**

C301.1	Understand the concepts of control system with examples and solve the transfer function of the control systems
C301.2	Describes the time response of both first order and second order systems
C301.3	Evaluate various frequency domain specifications of control system.
C301.4	Analyze the concept of stability in frequency-domain and time-domain by using various methods
C301.5	Design the various compensation techniques in control systems.
C301.6	Evaluate the concepts of state space in continuous systems.

Course Name: **ANALOG COMMUNICATIONS** **C302** **Course Year: 2015-16**

C302.1	Understand the basic elements of a communication system and the need for modulation.
C302.2	Design a linear and non-linear communication modulator and demodulator
C302.3	Define the meaning of baseband communication system and formulate different mathematical representations of band pass signals.
C302.4	Compare the performances of various analog modulation techniques in the presence of noise.
C302.5	Differentiate between AM and FM transmitters and TRF and Superheterodyne receivers.
C302.6	Know the use of analog pulse modulation and demodulation techniques.

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Course Name: **LINEAR IC APPLICATIONS** **C303** **Course Year: 2015-16**

C303.1	Define and describes the internal operation of an Op-Amp and its specifications.
C303.2	Explain and summarize the linear and nonlinear applications of Op-Amps.
C303.3	Construct various types of active filters and solve the problems based on frequency response characteristics.
C303.4	Analyze IC 555 timer in different modes like mono stable and stable operations and study their applications. Identifying the lock range and capture range of PLL.
C303.5	Describe and Compare Various A to D and D to A conversion techniques.
C303.6	Design and explain the operation of analog multiplier and modulators.

Course Name: **ANTENNAS& WAVE PROPAGATION** **C304** **Course Year: 2015-16**

C304.1	Comprehend the basic parameters like patterns, gain, beam area, and radiation intensity of an antenna
C304.2	Use the basic Maxwell's equations for evaluating the field components, power radiated and radiation resistance of a dipole and loop antennas.
C304.3	Combine the individual patterns of point sources to devise an array of antennas for increasing the radiation characteristics.
C304.4	Differentiate the geometries of helical, reflector and lens antennas to relate how they are used in VHF and UHF communications.
C304.5	Estimate the impact of different parameters of micro strip antennas like thickness, dielectric substrate, and width on its characteristics
C304.6	Summarize the wave Characteristics in different frequency ranges.

Course Name: **COMPUTER ORGANIZATION** **C305** **Course Year: 2015-16**

C305.1	Outlines the basic concepts of computer organization and arithmetic
C305.2	Explain the basic concepts of instruction cycle and different addressing modes of an instruction
C305.3	Analyze the computer arithmetic algorithms for addition, subtraction, division and multiplication operations
C305.4	Understand the concepts of register transfer and control unit of a computer organization.
C305.5	Create an analogy on memory and I/O organization of a computer.
C305.6	Comprehends the concepts of different pipelining techniques and interprets the concepts of multiprocessor architectures.

Course Name: **DIGITAL IC APPLICATIONS** **C306** **Course Year: 2015-16**

C306.1	Understand digital integrated circuits design of the CMOS and Bipolar Logic families, there logic function implementations.
C306.2	Describe, simulate and synthesize Digital hardware using the VHDL hardware description language
C306.3	Develop program codes for structural and behavioral modeling of combinational and sequential logic using VHDL in any problem identification, formulation and solution.
C306.4	Complete tasks and assignments effectively as instructed with the use of any combinational and sequential circuits using digital ICs.
C306.5	Create new digital hardware using VHDL programming.
C306.6	Understanding of basic semiconductor memory concepts, such as organization and memory types (ROMs, PROMs, EPROMs, EEPROMs, static RAMS, and dynamic RAMs).

Course Name: **LINEAR& DIGITAL IC APPLICATIONS LAB** **C307** **Course Year: 2015-16**

C307.1	Analyze Op-amp applications and distinguish frequency response of active filters (1st order).
C307.2	Generate sinusoidal, triangular & square waveform using op-amp.
C307.3	Design Astable and Monostablemultivibrators using 555 timer.
C307.4	Compute the 4 bit DAC output voltage theoretically and practically.

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C307.5	Apply and implement VHDL code for logic gates, mux, demux, encoder, decoder, using hardware kit.
C307.6	Generate VHDL code for D flip flop, counter, JKFlip-Flop, universal shift register using hardware kit.

Course Name:**PULSE & DIGITAL CIRCUITS LAB** **C308** **Course Year: 2015-16**

C308.1	Apply specifications of Triggers
C308.2	Generate various digital circuits based on the application and specifications
C308.3	Apply various multivibrators specifications
C308.4	Implement various logical gates
C308.5	Understand various linear and non-linear wave shaping concepts
C308.6	Apply the knowledge of transistors and switches

III-II

Course Name: **DIGITAL COMMUNICATIONS** **C309** **Course Year: 2015-16**

C309.1	Understand the basic concepts of digital communications with an insight into practical applications and the importance of conversion of analog signals in to digital domain.
C309.2	Analyze different modulation techniques like PCM, DM and DPCM.
C309.3	Distinguish baseband transmission techniques and passband transmission techniques.
C309.4	Interpret the differences between the usage of systematic linear block codes (LBC) and convolutional codes for non-burst and burst channel applications.
C309.5	Apply the basics of information theory to calculate channel capacity and other measures.
C309.6	Compare and contrast ASK, FSK, PSK digital carrier modulation schemes in terms of occupied bandwidth, complexity etc., and extend these into QPSK, MPSK, QAM for improved spectral efficiency.

Course Name: **MICROPROCESSORS & MICROCONTROLLERS** **C310** **Course Year: 2015-16**

C310.1	Study the internal register organization, architecture of 8086 microprocessor with instruction set and apply the knowledge to program 8086 using assembly level language for real time applications.
C310.2	Study the hardware pin architecture and interfacing external memory in 8086 microprocessor.
C310.3	Analyze the concept of interfacing external peripheral devices 8255, 8279, ADC and DAC with 8086 and program them using ALP.
C310.4	Analyze the concept of interfacing serial data transfer methods 8251 and high speed serial communication standards USB, RS232c in 8086.
C310.5	Study the concepts of interrupts and interfacing external peripheral devices 8259 and programmable timer interval 8253 in 8086.
C310.6	Classify the features, internal architecture of microcontroller 8051and program 8051 using ALP and compare 8051 with advanced microcontrollers, ARM processors.

Course Name: **DIGITAL SIGNAL PROCESSING** **C311** **Course Year: 2015-16**

C311.1	Analyze and implement digital signal processing techniques to LTI systems and study the properties. Analyze and implement digital systems using the DTFT.
C311.2	Understand the concept of digital systems using the DFS and DFT and determine the response of LTI system using convolution
C311.3	Analyze and implement digital systems Fast Fourier Transform (FFT) techniques.
C311.4	Use Z transforms to analyze a digital system & learn the basic structures of IIR & FIR
C311.5	Understand and Design IIR and FIR filters B109
C311.6	Analyze multirate structures and design interpolator & decimator. Excel in fields such as speech processing, audio signal processing, and digital image processing, video and audio compression.

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Course Name: **ELECTRONIC MEASUREMENTS &INSTRUMENTATION C312**
Course Year: 2015-16

C312.1	Outlines the basic concepts of various electrical measuring devices with accuracy, precision and resolution
C312.2	To understand the various signal generators and how these signals are analyzed using wave analyzers.
C312.3	Explains the working principle of CRO and its types in calculating frequency and phase of a signal
C312.4	Applies appropriate bridging techniques for measuring the various electrical components.
C312.5	Understand the technical specifications of sensors and transducers for collaborative leaning
C312.6	Apply the principles and practice for PC based instrument design for real world problems.

Course Name: **VLSI DESIGN C313 Course Year: 2015-16**

C313.1	Analyze the various VLSI processing techniques and fabrication principles, how the design layers are used in the process sequence, and resulting device structures (i.e. cross-sectional views).
C313.2	Use mathematical methods and circuit analysis models in the analysis of MOS digital electronics circuits.
C313.3	An ability to design logic circuit, stick diagrams and layouts for different MOS circuits and scaling factors.
C313.4	Analyze the influence of wires/interconnects on VLSI circuit performance
C313.5	Build up sub system design which includes peripherals and semiconductor memory elements by using VLSI design rules and acquire the knowledge on various array logic circuits.
C313.6	Understand a hardware design language such as VHDL in detail - syntax as well as how it works under the hood for simulation and synthesis and about different levels of CMOS testing

Course Name: **MICROWAVE ENGINEERING C314 Course Year: 2015-16**

C314.1	Recall the basic Maxwell's equations and apply to solve the wave equations in rectangular waveguide.
C314.2	Infer the concepts of cavity resonators and compute the dominant modes and resonant frequencies.
C314.3	Analyze different waveguide components and predict how these components are used in microwave communication.
C314.4	Relate how an electron beam interacts with the electrostatic field in cavity to generate microwaves in Klystron tubes.
C314.5	Comprehend the significance of slow wave structures for amplification in travelling wave tubes and Interpret the applications of microwave solid state devices by describing their operation.
C314.6	Estimate different blocks of microwave bench and describe how parameters like VSWR, Attenuation,Impedance,Power can be measured using bench.

Course Name: **ANALOG & DIGITAL COMMUNICATIONS LAB C315 Course Year: 2015-16**

C315.1	Design different types of modulators and demodulators for analog communications.
C315.2	Study the characteristics of a Time division multiplexing and demultiplexing
C315.3	Design differential phase shift keying and frequency shift keying
C315.4	Compute the specifications of a Radio Receiver
C315.5	Design delta modulation and demodulation.
C315.6	Generate the digital communication modulators and demodulators using MATLAB

Course Name: **ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS LAB C316**
Course Year: 2015-16

C316.1	Ability to use language effectively in everyday conversations
C316.2	Getting exposure to various environments
C316.3	Ability to pronounce correctly
C316.4	Capability to acquire fluency in spoken English

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C316.5	Ability to translate from Mother Tongue to English effectively
C316.6	Ability to face interviews / group discussions to acquire proficiency towards employability

IV-I

Course Name: **MANAGEMENT SCIENCE** **C401** **Course Year: 2016-17**

C401.1	Understand the concepts of management.
C401.2	Relating this to the real life (organization/company).
C401.3	Knowthe concepts of business and management.
C401.4	Understand how the company involved in decision making.
C401.5	Identify plant layout and location.
C401.6	Know about production activities.

Course Name: **EMBEDDED REAL TIME OPERATING SYSTEMS C402** **Course Year: 2016-17**

C402.1	Outlines and estimates the basic elements, applications, quality attributes of embedded system, modeling and design of embedded systems with UML.
C402.2	Constructs and prepares the design and development of embedded hardware using EDA tools.
C402.3	Analyzes the concept of Real Time Operating system and identifiesthe interfacing concepts of communication BUS and wireless devices to embedded systems.
C402.4	Outlines and diagrams the concept of program, DFG, FSM models to embedded system.
C402.5	Identifies and defends the unique characteristics of real-time operating systems, design issues and challenges of real-time operating systems.
C402.6	Summarizes the case studies of real time applications (Orchestra robots, Auto mobile and Smart card system) and relates the advantages.

Course Name: **COMPUTER NETWORKS** **C403** **Course Year: 2016-17**

C403.1	Analyze the hardware, software, components of a network and the interrelations. Compare protocol models and select appropriate protocols for a particular design.
C403.2	Describe how data is transmitted without errors using various protocols and able to differentiate various types of networks
C403.3	Understand to route the data in internetworking without congestion using internet protocol
C403.4	Differentiating the various types of network configurations and applying them to meet the changing and challenging networking needs of organizations.
C403.5	Define and analyze the communication protocols and interface methods used by users
C403.6	Develop solutions for networking and security problems

Course Name: **OPTICAL COMMUNICATIONS** **C404** **Course Year: 2016-17**

C404.1	Analyze different optical propagation methods and understand cylindrical fibers and mode configurations
C404.2	Understand the different fabrication methods used in optical fibers and factors causing signal distortion
C404.3	Evaluate the signal degradation at fiber joints and fiber splices
C404.4	Describe the characteristics of optical sources and detectors, and power launching capability of optical fiber
C404.5	Evaluate the power penalties by system considerations in the link, error control corrections and detections
C404.6	Infer the impact of WDM in optical communication.

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Course Name:**RADAR SYSTEMS** **C405** **Course Year: 2016-17**

C405.1	Analyze the basic concepts of Radar and Radar Equations
C405.2	Explain the concepts of CW& FM-CW radar
C405.3	Understand the working principal of MTI and Pulse Doppler Radar.
C405.4	Describe the operation of Tracking radar and its types
C405.5	Evaluate the Detection of Signals in Noise by using filtering concepts
C405.6	Summarize the types of displays, duplexers at the radar receivers and infer the basic concepts of antenna parameters.

Course Name: **DIGITAL DESIGN THROUGH VERILOG HDL C406** **Course Year: 2016-17**

C406.1	Describe, design levels and comprehend the lexical tokens in Verilog HDL.
C406.2	Compose and evaluate gate level, data flow, and behavioural level modelling for a given digital circuit.
C406.3	Evaluate time delays in modelling a digital circuit with switch primitives and comprehending the instantiations with strengths and delays.
C406.4	Estimate, construct and analyze state machine charts for digital design.
C406.5	Describe Xilinx FPGAs which composes a digital design with programmable gate arrays.
C406.6	Comprehend and contrast memory models and analyzing memory interface to microprocessor bus.

Course Name: **MICROWAVE &OPTICAL COMMUNICATIONS LAB C407** **Course Year:2016-17**

C407.1	Estimate different components of microwave bench used to measure the different parameters at microwave frequencies like impedance, attenuation, and VSWR
C407.2	Generalize how an electron beam interacts with the electrostatic field in Klystron tube to generate modes at different repeller voltages
C407.3	Estimate and relate how the microwave energy is coupled from input port of primary waveguide to ports of secondary waveguide of a multi-hole directional coupler.
C407.4	Compare the relationship between the LED dc forward current and the LED optical power output and determine the linearity of the device at 660nm as well as 850nm.
C407.5	Relate the Optical Power (Po)of a Laser Diode vs Laser Diode Forward Current (I_F)
C407.6	Determine the numerical aperture of the optical fiber and study various types of losses that occur in optical fibers

Course Name: **MICROPROCESSORS & DIGITAL SIGNAL PROCESSING LAB C408**
COURSE YEAR: 2016-17

C408.1	Comprehend assembly language programs for arithmetic, logical and string manipulation operations in 8086 microprocessor.
C408.2	Analyze assembly language programs for interfacing various peripherals like timers, interrupt controllers and display devices with 8086 microprocessor.
C408.3	Infers assembly language programs in 8051 microcontroller for arithmetic, logical and string manipulation operations.
C408.4	Design, analyze, and evaluate real time DSP architecture and also implement the filtering algorithms.
C408.5	Summarize the convolution and power spectral density of signals using code composure studio DSP software
C408.6	Contrasts and describe the FIR & IIR filters, LP/Hp filters using MATLAB.

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Course Name: CELLULAR & MOBILE COMMUNICATIONS C409 Course Year:2016-17

C409.1	Understand some of the contemporary issues in the cellular communications engineering profession.
C409.2	Understand the cellular and frequency reuse concept, cell splitting, co-channel interference
C409.3	Understand and explain cell coverage for signal & traffic
C409.4	Different antennas & their purposes for cell sites & mobile units
C409.5	Describe the Basic Design and Planning of a wireless cellular system and different types of Hand offs, dropped calls
C409.6	Understand the Digital cellular networks

Course Name: **DIGITAL IMAGE PROCESSING C410 Course Year: 2016-17**

C410.1	Analyze the various mathematical tools employed in the applications of digital image processing.
C410.2	Understand the various algorithms in spatial and frequency domain employed for the enhancement of image quality.
C410.3	Evaluate the various mathematical models employed for restoration of degraded images.
C410.4	Compute the different Image transforms employed in digital image processing.
C410.5	Analyze various methods employed for image compression and segmentation.
C410.6	Understand the different color models along with the various methods employed for color image processing.

Course Name: **SATELLITE COMMUNICATIONS C411 Course Year: 2016-17**

C411.1	Know the basics of satellite origin, to analyze the orbital mechanisms and describes about "launch and launch vehicles
C411.2	List the parameters that effect the satellites' operation and functions and can evaluate the transmitted power of the antenna.
C411.3	Explain the effects of system temperatures in satellite links and illustrates how satellite communications are carried out with the aid of TDMA, and other multiple accessing techniques.
C411.4	Understand and analyze satellite link in terms of antennas.
C411.5	Differentiate the purposes of different orbits in satellite applications.
C411.6	Understand and uses the services of GPS and the satellite navigation systems.

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