

KLN COLLEGE OF ENGINEERING
B.E. Computer Science and Engineering
Choice Based Credit System Regulation–2017
I-VIII Semesters Course Outcomes

S.No.	Sem	Course Code	Subject Code	Course Title
1.	I	C101	HS8151	Communicative English
2.		C102	MA8151	Engineering Mathematics - I
3.		C103	PH8151	Engineering Physics
4.		C104	CY8151	Engineering Chemistry
5.		C105	GE8151	Problem Solving and Python Programming
6.		C106	GE8152	Engineering Graphics
7.		C107	GE8161	Problem Solving and Python Programming Laboratory
8.		C108	BS8161	Physics and Chemistry Laboratory
9.	II	C109	HS8251	Technical English
10.		C110	MA8251	Engineering Mathematics - II
11.		C111	PH8252	Physics for Information Science
12.		C112	BE8255	Basic Electrical, Electronics and Measurement Engineering
13.		C113	GE8291	Environmental Science and Engineering
14.		C114	CS8251	Programming in C
15.		C115	GE8261	Engineering Practices Laboratory
16.		C116	CS8261	C Programming Laboratory
17.	III	C201	MA8351	Discrete Mathematics
18.		C202	CS8351	Digital Principles and System Design
19.		C203	CS8391	Data Structures
20.		C204	CS8392	Object Oriented Programming
21.		C205	EC8395	Communication Engineering
22.		C206	CS8381	Data Structures Laboratory
23.		C207	CS8383	Object Oriented Programming Laboratory
24.		C208	CS8382	Digital Systems Laboratory
25.		C209	HS8381	Interpersonal Skills/Listening &Speaking
26.	IV	C210	MA8402	Probability and Queueing Theory
27.		C211	CS8491	Computer Architecture
28.		C212	CS8492	Database Management Systems
29.		C213	CS8451	Design and Analysis of Algorithms
30.		C214	CS8493	Operating Systems
31.		C215	CS8494	Software Engineering
32.		C216	CS8481	Database Management Systems Laboratory
33.		C217	CS8461	Operating Systems Laboratory
34.		C218	HS8461	Advanced Reading and Writing

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S.No.	Sem	Course Code	Subject Code	Course Title
1.	V	C301	MA8551	Algebra and Number Theory
2.		C302	CS8591	Computer Networks
3.		C303	EC8691	Microprocessors and Microcontrollers
4.		C304	CS8501	Theory of Computation
5.		C305	CS8592	Object Oriented Analysis and Design
6.		CE306	OEC552	Soft Computing (Open Elective I)
7.		C307	EC8681	Microprocessors and Microcontrollers Lab
8.		C308	CS8582	Object Oriented Analysis and Design Laboratory
9.		C309	CS8581	Networks Laboratory
10.	VI	C310	CS8651	Internet Programming
11.		C311	CS8691	Artificial Intelligence
12.		C312	CS8601	Mobile Computing
13.		C313	CS8602	Compiler Design
14.		C314	CS8603	Distributed Systems
15.		CE315	-	Professional Elective I
16.		C316	CS8661	Internet Programming Laboratory
17.		C317	CS8662	Mobile Application Development Laboratory
18.		C318	CS8611	Mini Project
19.		C319	HS8581	Professional Communication
20.	VII	C401	MG8591	Principles of Management
21.		C402	CS8792	Cryptography and Network Security
22.		C403	CS8791	Cloud Computing
23.		CE404	-	Open Elective II
24.		CE405	-	Professional Elective II
25.		CE406	-	Professional Elective III
26.		C407	CS8711	Cloud Computing Laboratory
27.		C408	IT8761	Security Laboratory
28.	VIII	CE409	-	Professional Elective IV
29.		CE410	-	Professional Elective V
30.		C411	CS8811	Project Work

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PROFESSIONAL ELECTIVES (PE)

SEMESTER VI

ELECTIVE – I

S.No.	Subject Code	Course Title
1.	CS8075	Data Warehousing and Data Mining
2.	IT8076	Software Testing
3.	IT8072	Embedded Systems
4.	CS8072	Agile Methodologies
5.	CS8077	Graph Theory and Applications
6.	IT8071	Digital Signal Processing
7.	GE8075	Intellectual Property Rights

SEMESTER VII

ELECTIVE – II

S.No.	Subject Code	Course Title
1.	CS8091	Big Data Analytics
2.	CS8082	Machine Learning Techniques
3.	CS8092	Computer Graphics and Multimedia
4.	IT8075	Software Project Management
5.	CS8081	Internet of Things
6.	IT8074	Service Oriented Architecture
7.	GE8077	Total Quality Management

ELECTIVE – III

S.No.	Subject Code	Course Title
1.	CS8083	Multi-core Architectures and Programming
2.	CS8079	Human Computer Interaction
3.	CS8073	C# and .Net Programming
4.	CS8088	Wireless Adhoc and Sensor Networks
5.	CS8071	Advanced Topics on Databases
6.	GE8072	Foundation Skills in Integrated Product Development
7.	GE8074	Human Rights
8.	GE8071	Disaster Management

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SEMESTER VIII

ELECTIVE – IV

S.No.	Subject Code	Course Title
1.	EC8093	Digital Image Processing
2.	CS8085	Social Network Analysis
3.	IT8073	Information Security
4.	CS8087	Software Defined Networks
5.	CS8074	Cyber Forensics
6.	CS8086	Soft Computing
7.	GE8076	Professional Ethics in Engineering

ELECTIVE – V

S.No.	Subject Code	Course Title
1.	CS8080	Information Retrieval Techniques
2.	CS8078	Green Computing
3.	CS8076	GPU Architecture and Programming
4.	CS8084	Natural Language Processing
5.	CS8001	Parallel Algorithms
6.	IT8077	Speech Processing
7.	GE8073	Fundamentals of Nano Science

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I YEAR / I SEMESTER

COURSE CODE / SUBJECT CODE & NAME: C101/ HS8151 & Communicative English

C101.1	Listen and recognize main ideas from different discourses in different accents
C101.2	Speak clearly, confidently, comprehensively and communicate with one or many listeners using appropriate communicative strategies
C101.3	Read different genres of text adopting various reading strategies
C101.4	Write cohesively and coherently by using a wide range of vocabulary and organize ideas logically on a topic without grammatical errors
C101.5	Determine the main and subordinate ideas, draws conclusion and summarize information from written material

COURSE CODE / SUBJECT CODE & NAME: C102/ MA8151 & Engineering Mathematics I

C102.1	Use both the limit definition and rules of differentiation to differentiate functions
C102.2	Apply differentiation to solve maxima and minima problems
C102.3	Evaluate integrals both by using Reimann sums and by using the fundamental theorem of calculus and determine the convergence/divergence of improper integrals and evaluate convergent improper integrals. Evaluate integrals using techniques of integration, such as substitution, partial fractions, integration by parts and improper integrals
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables
C102.5	Apply various techniques in solving different equations

COURSE CODE / SUBJECT CODE & NAME: C103/ PH8151& Engineering Physics

C103.1	Demonstrate the properties of elasticity and measure the different moduli of elasticity
C103.2	Examine the characteristics of waves, Laser and optical fiber
C103.3	Illustrate different modes of heat transfer through objects
C103.4	Explain the black body radiation, properties of matter waves and schrodinger equations
C103.5	Classify the bravais lattices and different types of crystal structures

COURSE CODE / SUBJECT CODE & NAME: C104/ CY8151& Engineering Chemistry

C104.1	Explain the hardness of water, its types and estimation, boiler troubles and treatment of boiler feed water
C104.2	Explain adsorption, types and theories of adsorption isotherm and its application in pollution abatement, theories of catalysis and applications
C104.3	Understand the basic concepts of phase rule and its application to one and two component systems, properties, significance and appliances of alloys
C104.4	Relate the significance of solid, liquid and gaseous fuels and to calculate the calorific values of fuels
C104.5	Illustrate the methods of harvesting energy from non/conventional energy sources

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COURSE CODE / SUBJECT CODE & NAME: C105 / GE8151 & Problem Solving & Python Programming

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

COURSE CODE / SUBJECT CODE & NAME: C106 / GE8152 & Engineering Graphics

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

COURSE CODE / SUBJECT CODE & NAME: C107 / GE8161 & Problem Solving & Python Programming Laboratory

C107.1	Develop solutions to simple computational problems using Python programs.
C107.2	Solve problems using conditionals and loops in Python.
C107.3	Develop Python programs by defining functions and calling them.
C107.4	Use Python lists, tuples and dictionaries for representing compound data.
C107.5	Develop Python programs using files.

COURSE CODE / SUBJECT CODE & NAME: C108/ BS8161& Physics and Chemistry Laboratory

Physics Laboratory

C108.1	Determine and estimate the types of alkalinity and hardness of a given water sample.
C108.2	Estimate the amount of copper content present in a given sample.
C108.3	Determine the strength of an acid by using pH meter
C108.4	Determine the strength of a pure acid and mixture of acids by using conductivity meter
C108.5	Estimate the amount of iron content present in a given solution by means of potentiometric titration

Chemistry Laboratory

C108.1	To evaluate moment of inertia of disc and rigidity modulus for thin wire using Torsion pendulum
C108.2	To appraise Young's modulus of the beam by Non/Uniform bending method
C108.3	To measure the wavelength of LASER, particle size and basic parameter of optical fibre using Semiconductor diode LASER
C108.4	To examine the thermal conductivity of bad conductors using Lee's disc apparatus
C108.5	To determine the wavelength of the prominent spectral lines

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I YEAR / II SEMESTER

COURSE CODE / SUBJECT CODE & NAME: C109 / HS8251 & Technical English

C109.1	Read technical texts and write area specific texts effortlessly
C109.2	Listen and comprehend lectures and talks in their area of specialization successfully
C109.3	Speak appropriately and effectively in varied formal and informal contexts
C109.4	Write reports and winning job applications
C109.5	Use appropriate technologies to organize, present, and communicate information to address a range of audiences, purpose, genres

COURSE CODE / SUBJECT CODE & NAME: C110 / MA8251 & Engineering Mathematics II

C110.1	Calculate the eigen values and eigen vectors, diagonalization of a matrix symmetric matrices, positive definite matrices and similar matrices
C110.2	Evaluate of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification
C110.3	Determine Analytic functions, conformal mapping and Bilinear transformation
C110.4	Evaluate of Cauchy's integrals, Taylor's and Laurent's and residue theorem for evaluation for real integrals using circular and semi/circular, contour
C110.5	Evaluate Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients

COURSE CODE / SUBJECT CODE & NAME: C111 / PH8252 / Physics for Information Science

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

COURSE CODE / SUBJECT CODE & NAME: C112 / BE8255 / Basic Electrical, Electronics and Measurement Engineering

C112.1	Apply the fundamental laws and network theorems to solve simple and complex linear circuits
C112.2	Explain the basic principle of electrical machines and their performance
C112.3	Describe the different energy sources, protective devices and their field applications
C112.4	Discuss the fundamentals of electronic circuit using diode, transistor and Op amps.
C112.5	Explain the principles and operation of measuring instruments and transducer

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COURSE CODE / SUBJECT CODE & NAME: C113 / GE8291 / Environmental Science and Engineering

C113.1	Explain the values, threats and conservation of biodiversity and classify various ecosystems
C113.2	Identify and implement technological and economical solution to environmental pollution
C113.3	Develop the knowledge on various natural resources, their causes and their efforts
C113.4	Explain various environmental acts and to explain various disaster management
C113.5	Relate population growth and environment and the role of IT in environment and human health

COURSE CODE / SUBJECT CODE & NAME: C114 / CS8251 & Programming in C

C114.1	Develop simple applications in C using basic constructs
C114.2	Design and implement applications using arrays and strings
C114.3	Develop and implement applications in C using functions and pointers.
C114.4	Develop applications in C using structures.
C114.5	Design applications using sequential and random access file processing.

COURSE CODE / SUBJECT CODE & NAME: C115 / GE8261 & Engineering Practices Lab

C115.1	Apply the knowledge of pipeline connections to household fittings and industrial buildings
C115.2	Prepare the different joints in roofs, doors, windows and furniture
C115.3	Perform step turning operation in a lathe
C115.4	Perform the various welding processes and know about its applications
C115.5	Produce a funnel using sheet metal

COURSE CODE / SUBJECT CODE & NAME: C116 / CS8261 & C Programming Laboratory

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

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II YEAR / III SEMESTER

COURSE CODE / SUBJECT CODE & NAME: C201 / MA8351 / Discrete Mathematics

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

COURSE CODE / SUBJECT CODE & NAME: C202 / CS8351 & Digital Principles and System Design

C202.1	Apply Arithmetic operations in any number system and various techniques to simplify the Boolean function
C202.2	Build combinational circuits that perform arithmetic operations & code Conversions
C202.3	Design synchronous sequential circuits
C202.4	Design Asynchronous sequential circuits
C202.5	Model memory arrays for any boolean function

COURSE CODE / SUBJECT CODE & NAME: C203 / CS8391 & Data Structures

C203.1	Explain the fundamental data structures concept and ADT
C203.2	Summarize the various lines data structure operations and applications
C203.3	Discuss about trees operations and applications
C203.4	Discuss about graph operations and applications
C203.5	Demonstrate the sorting, searching and hashing techniques in Data Structures

COURSE CODE / SUBJECT CODE & NAME: C204 / CS8392 & Object Oriented Programming

C204.1	Explain the Concepts of Object Oriented Programming & the Fundamentals of Java Program.
C204.2	Explain the Principles of inheritance & interfaces.
C204.3	Discuss the Concept of Exception handling mechanism & I/O Streams.
C204.4	Use the Concept of multi/threading & generics classes in java
C204.5	Apply the AWT & Swing concepts to build GUI application.

COURSE CODE / SUBJECT CODE & NAME: C205 / EC8395 & Communication Engineering

C205.1	Illustrate Analog Modulation Techniques.
C205.2	Explain Pulse Modulation Techniques.
C205.3	Illustrate digital Modulation & Transmission Techniques
C205.4	Make use of various error control coding techniques to identify / correct errors.
C205.5	Out time spread spectrum & multiple Access Techniques.

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COURSE CODE / SUBJECT CODE & NAME: C206 / CS8381 & Data Structures Laboratory

C206.1	Compute array implementation of Stack, Queue and List ADT's using C Program
C206.2	Demonstrate linked list implementation of List Stack and Queue ADT
C206.3	Manipulate binary Trees, Binary search trees and AVL Tree and its operations
C206.4	Compute Graph representation and traversal algorithms
C206.5	Examine searching, sorting and hashing algorithms

COURSE CODE / SUBJECT CODE & NAME: C207 / CS8383 & Object Oriented Programming Laboratory

C207.1	To understand and apply the concepts of classes, Packages, interface & inheritance
C207.2	To develop java program for practicing exception handling of files
C207.3	To develop application using generic programming & event handling
C207.4	To built software development skills in java
C207.5	To develop a java program for real world application

COURSE CODE / SUBJECT CODE & NAME: C208 / CS8382 & Digital Systems Laboratory

C208.1	Apply Boolean simplification techniques to construct combinational logic circuits
C208.2	Build combinational logic circuits to perform arithmetic operations
C208.3	Construct sequential logic circuits to perform Count & Shift operations
C208.4	Develop HDL Code to Model Combinational & Sequential logics
C208.5	Develop a simple digital system

COURSE CODE / SUBJECT CODE & NAME: C209 / HS8381 & Interpersonal Skills / Listening and Speaking

C209.1	Equip with primary emphasis on academic speaking and listening skills.
C209.2	Engage in specific academic speaking activities
C209.3	Improve general and academic listening skills
C209.4	Make effective presentations
C209.5	Participate in group discussions

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II YEAR / IV SEMESTER

COURSE CODE / SUBJECT CODE & NAME: C210 / MA8402 & Probability and Queueing Theory

C210.1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon
C210.2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications
C210.3	Apply the concept of random processes in engineering disciplines
C210.4	Acquire skills in analyzing queueing models
C210.5	Understand and characterize phenomenon which evolve with respect to time in a Probabilistic manner

COURSE CODE / SUBJECT CODE & NAME: C211 / CS8491 & Computer Architecture

C211.1	Explain the computer organization components, instructions and addressing modes
C211.2	Summarize arithmetic operations
C211.3	Discuss the basic of MIPS implementation and pipelining
C211.4	Explain the concept of parallelism and multi/core processor
C211.5	Generalize the memory technologies and I/O systems

COURSE CODE / SUBJECT CODE & NAME: C212 / CS8492 & Database Management Systems

C212.1	Summarize database design for real time applications
C212.2	Apply ER diagram and normalization techniques for database applications
C212.3	Apply concurrency control & recovery mechanism for database problems
C212.4	Compare and control various indexing strategies in different database systems
C212.5	Classify advanced database design

COURSE CODE / SUBJECT CODE & NAME: C213/ CS8451 & Design and Analysis of Algorithms

C213.1	Interpret the fundamental needs of algorithms in problem solving
C213.2	Classify the different algorithm design techniques for problem solving
C213.3	Develop algorithms for various computing problems
C213.4	Analyze the time and space complexity of various algorithms
C213.5	Identify the limitations of algorithms in problem solving

COURSE CODE / SUBJECT CODE & NAME: C214 / CS8493 & Operating Systems

C214.1	Explain the basic concepts and functions of Operating Systems (UN)
C214.2	Explain various threading models, process synchronization and deadlocks (UN)
C214.3	Analyze the performance of various CPU scheduling algorithms (Analyze)
C214.4	Discuss various memory management schemes (UN)
C214.5	Explain I/O management and file systems (UN)
C214.6	Explain administrative tasks on Linux servers and distinguish iOS and Android OS

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COURSE CODE / SUBJECT CODE & NAME: C215 / CS8494 & Software Engineering

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

COURSE CODE / SUBJECT CODE & NAME: C216 / CS8481 & Database Management Systems Laboratory

C216.1	Describe the various data base commands for the data definition, data manipulation and transaction control statements
C216.2	Discuss the data base queries by using Simple queries, Nested queries, Sub queries, Joins, Views, Sequences, Synonyms and cursors
C216.3	Use the procedures, functions, triggers and exception handling of the database
C216.4	Analyze the database design by using ER modeling and normalization concepts
C216.5	Develop solutions using database concepts for real time requirements

COURSE CODE / SUBJECT CODE & NAME: C217 / CS8461 & Operating Systems Laboratory

C217.1	Examine various Unix commands and shell programming [AP]
C217.2	Point out the best CPU scheduling algorithm for a given problem instance [AP]
C217.3	Demonstrate Semaphores, deadlock avoidance and detection algorithms [AP]
C217.4	Operate on processes, Threads and implement IPS [AP]
C217.5	Examine various memory management and file management techniques [AP]

COURSE CODE / SUBJECT CODE & NAME: C218 / HS8461 & Advanced Reading & Writing

C218.1	Strengthen the reading skills
C218.2	Enhance the technical writing skills
C218.3	Develop critical thinking skills.
C218.4	Develop proposal writing skills.
C218.5	Write winning job applications.

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III YEAR / V SEMESTER

COURSE CODE / SUBJECT CODE & NAME: C301 / MA8551 & Algebra & Number Theory

C301.1	Apply the basic notions of groups, rings, fields which will then be used to solve related problems
C301.2	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts
C301.3	Demonstrate accurate and efficient use of advanced algebraic techniques
C301.4	Demonstrate their mastery by solving non trivial problems related to the concepts, and by proving Simple theorems about the statements proven by the text
C301.5	Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject

COURSE CODE / SUBJECT CODE & NAME: C302 / CS8591 & Computer Networks

C302.1	Explain about the protocol layering and physical level communication.
C302.2	Manipulate the Data link layer and Media Access Control Protocols
C302.3	Demonstrate various types of routing techniques
C302.4	Outline the mechanisms involved in Transport Layer.
C302.5	Examine with different application layer protocols

COURSE CODE / SUBJECT CODE & NAME: C303 / EC8691 & Microprocessor and Microcontroller

C303.1	Explain about the architecture of microprocessor and microcontroller
C303.2	Demonstrate the programs on 8086 microprocessor
C303.3	Illustrate the Bus structure and communication of microprocessor
C303.4	Illustrate the design aspects of I/O and memory interfacing circuits
C303.5	Develop a simple microcontroller based systems

COURSE CODE / SUBJECT CODE & NAME: C304 / CS8501 & Theory of Computation

C304.1	Design finite automata and regular expression for any pattern
C304.2	Design of context free grammar and push down automaton model for the given language
C304.3	Translate the context free grammar into its various normal forms
C304.4	Solve simple computational problems by using Turing machine
C304.5	Explain decidability or undecidability of various problems

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COURSE CODE / SUBJECT CODE & NAME: C305 / CS8592 & Object Oriented Analysis and Design

C305.1	Explain OOAD concepts and various UML diagrams
C305.2	Select an appropriate design pattern
C305.3	Illustrate about domain models and conceptual classes
C305.4	Compare and contrast various testing techniques
C305.5	Construct projects using UML diagrams

COURSE CODE / SUBJECT CODE & NAME: CE306 / OEC552 & Soft Computing

CE306.1	Apply various soft computing concepts for practical applications.
CE306.2	Choose and design suitable neural networks for real time problems.
CE306.3	Use fuzzy rules and reasoning to develop decision making and expert system.
CE306.4	Explain the importance of optimization techniques and genetic programming.
CE306.5	Review the various hybrid soft computing techniques and apply in real time problems.

COURSE CODE / SUBJECT CODE & NAME: C307 / EC8681 & Microprocessor and Microcontroller Laboratory

C307.1	Develop ALP for fixed and Floating Point and Arithmetic operations using 8086 Microprocessor.
C307.2	Make use of different I/O interfacing with 8086 microprocessor
C307.3	Construct different waveforms using 8086 microprocessor
C307.4	Model serial and parallel interfacing of 8086 microprocessor
C307.5	Develop assembly language programs for various applications using 8051 microcontroller

COURSE CODE / SUBJECT CODE & NAME: C308 / CS8582 & Object Oriented Analysis and Design Laboratory

C308.1	Outline the problem statement for a given problem
C308.2	Construct USE CASE model to identify the classes and functionality of the system
C308.3	Show the objects interaction for all the system functionality
C308.4	Develop code from system design
C308.5	Examine the developed code using testing strategies

COURSE CODE / SUBJECT CODE & NAME: C309 / CS8581 & Networks Laboratory

C309.1	Demonstrate the Network Commands.
C309.2	Develop simple socket programming.
C309.3	Develop the code for Data link layer protocol simulation
C309.4	Examine with Congestion control algorithm using Network simulator.
C309.5	Illustrate the performance of various network protocols

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III YEAR / VI SEMESTER

COURSE CODE / SUBJECT CODE & NAME: C310 / CS8651 & Internet Programming

C310.1	Develop a basic website using HTML and Cascading Style Sheets
C310.2	Explain Javascript and JSON for Client side programming.
C310.3	Explain servlets with database connectivity for server side programming.
C310.4	Build a simple web page in PHP with XML data format
C310.5	Explain web services and client presentation using AJAX

COURSE CODE / SUBJECT CODE & NAME: C311 / CS8691 & Artificial Intelligence

C311.1	Determine and formulate a given A.I. problem that an Intelligent System must solve.
C311.2	Describe the role of heuristics and solve various types of search problems.
C311.3	Prepare for the ability to explore a variety of representational formalisms and associated algorithms
C311.4	Illustrate the complications of planning and intelligent agents acting in the Real world.
C311.5	Demonstrate the fundamental concepts of machine learning and its related algorithms in the applications of NLP and agent design.

COURSE CODE / SUBJECT CODE & NAME: C312 / CS8601 & Mobile Computing

C312.1	Explain the basics of mobile Computing
C312.2	Describe the functionality of Mobile IP and Transport Layer
C312.3	Classify different types of mobile telecommunication systems
C312.4	Demonstrate the Adhoc networks concepts and its routing protocols
C312.5	Make use of mobile operating systems in developing mobile applications

COURSE CODE / SUBJECT CODE & NAME: C313 / CS8602 & Compiler Design

C313.1	Explain the structure of the compiler and tokenization in lexical analysis.
C313.2	Illustrate the translation of tokens into Parse tree in syntax analyzer.
C313.3	Construct the intermediate representation considering the type systems
C313.4	Understand the storage allocation and organization for code generation.
C313.5	Apply code optimization techniques on the generated machine code.

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COURSE CODE / SUBJECT CODE & NAME: C314 / CS8603 & Distributed Systems

C 314.1	Explain the foundations and issues of distributed systems
C314.2	Explain the various synchronization issues and global state for distributed systems
C314.3	Explain the Mutual Exclusion and Deadlock detection algorithms in distributed systems
C314.4	Describe the agreement protocols and fault tolerance mechanisms in distributed systems.
C314.5	Describe the features of peer/ to / peer and distributed shared memory systems

COURSE CODE / SUBJECT CODE & NAME: CE315 / CS8075 / Data Warehousing and Data Mining

CE315.1	Summarize the data warehouse concepts, architecture, business analysis and tools
CE315.2	Explain the data pre-processing and data visualization techniques
CE315.3	Distinguish the algorithms for finding hidden and interesting patterns in data
CE315.4	Apply appropriate classification and clustering techniques for data analysis
CE315.5	Apply the Weka tool for data processing.

COURSE CODE / SUBJECT CODE & NAME: CE315 / IT8076 / Software Testing

CE315.1	Outline the software testing criteria for developing test cases
CE315.2	Build the test cases for software development
CE315.3	Explain the various level of testing
CE315.4	Discuss about the test metrics, measurements and Management process
CE315.5	Make use of the latest test tool for functional and performance testing

COURSE CODE / SUBJECT CODE & NAME: CE315 / IT8072 / Embedded Systems

CE315.1	Describe the architecture and programming of ARM processor.
CE315.2	Explain the concepts of embedded systems.
CE315.3	Understand the Concepts of peripherals and interfacing of sensors.
CE315.4	Capable of using the system design techniques to develop firm ware.
CE315.5	Illustrate the code for constructing a system.

COURSE CODE / SUBJECT CODE & NAME: CE315 / CS8072 / Agile Methodologies

CE315.1	Show the need of agile methodology in project management.
CE315.2	Apply agile process techniques in software development.
CE315.3	Given specification of information system and decision making apply agile methods to perform knowledge management.
CE315.4	Apply agile requirement engineering methods and techniques in requirements engineering process.
CE315.5	Given the specification for software development, use the agile metrics, financial, production metrics, quality assurance techniques to develop software product.

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COURSE CODE / SUBJECT CODE & NAME: CE315 / CS8077 / Graph Theory & Applications

CE315.1	Understand the basic concepts of graphs, and different types of graphs
CE315.2	Understand the properties of tree theorems and be able to prove theorems.
CE315.3	Illustrate the network flows, planar graph, directed graph and euler digraph.
CE315.4	Illustrate the graph of matrix representation and calculate the chromatic number, matching of the graph.
CE315.5	Apply suitable graph model and algorithm for solving applications.

COURSE CODE / SUBJECT CODE & NAME: CE315 / IT8071 / Digital Signal Processing

CE315.1	Understand the basics of discrete time signals, systems and their classifications.
CE315.2	Analyze the discrete time signals in both time and frequency domain.
CE315.3	Design low pass digital IIR filters according to predefined specifications based on analog filter theory and analog-to-digital filter transformation.
CE315.4	Design Linear phase digital FIR filters using fourier method, window technique.
CE315.5	Relate the concept and usage of DSP in various engineering fields.

COURSE CODE / SUBJECT CODE & NAME: CE315 / GE8075 / Intellectual Property Rights

CE315.1	Understand the fundamental legal principles relating to confidential information, copyright, patents, designs, trademarks and unfair competition.
CE315.2	Able to identify, apply principles of law relating to each of these areas of intellectual property and also understand the legal and practical steps needed to ensure that intellectual property rights remain valid and enforceable.
CE315.3	Analyze and evaluate the nature, regulation of contracts, evaluate the impact of legislation upon contract law and also scrutinize, apply the rules governing the requirement that the parties to a contract must reach an agreement comprised of offer and acceptance.
CE315.4	Able to demonstrate a capacity to identify, apply and assess ownership rights and marketing protection under intellectual property law as applicable to information, ideas, new products and product marketing.
CE315.5	Understand emerging issues relating to the intellectual property protection and also be able to anticipate and analysis arguments relating to the development and reform of intellectual property right.

COURSE CODE / SUBJECT CODE & NAME: C316 / CS8661 & Internet Programming Laboratory

C316.1	Illustrate web pages using HTML/XML and style sheets
C316.2	Analyze user interfaces using Java Script
C316.3	Compare and contrast dynamic web pages using server side scripting
C316.4	Develop a Client Server application using JSP.
C316.5	Build the applications using Web services.

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COURSE CODE / SUBJECT CODE & NAME: C317 / CS8662 & Mobile Application Development Laboratory

C317.1	Develop mobile application for given operating system and user access specification using GUI, Layouts.
C317.2	Given the OS specification develop mobile application with event listeners.
C317.3	Given the operating system and database specification develop a mobile application with appropriate database schemes.
C317.4	Develop mobile application using RSS Feed, internal/external storage, SMS, multithreading and GPS.
C317.5	Given the requirement specification select and use appropriate techniques to develop mobile app.

COURSE CODE / SUBJECT CODE & NAME: C318 / CS8611 & Mini Project

C318.1	Identify the problem by applying acquired knowledge.
C318.2	Analyze and categorize executable project modules after considering risks.
C318.3	Choose efficient tools for designing project modules.
C318.4	Combine all the modules through effective team work after efficient testing.
C318.5	Elaborate the completed task and compile the project report.

COURSE CODE / SUBJECT CODE & NAME: C319 / HS8581 & Professional Communication

C319.1	Summarize various skills such as Soft Skills, Hard skills, employability and career Skills and demonstrate values such as Time Management and general awareness of current affairs.
C319.2	Demonstrate oneself before the audience by making effective presentations on introducing oneself, answering questions and visual presenting.
C319.3	Demonstrate oneself by participating in group discussions, brainstorming sessions and question sessions. Develop activities to improve GD Skills.
C319.4	Develop interview skills so as to be successful in them.
C319.5	Develop adequate Soft Skills required for the workplace and long-term career.

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IV YEAR / VII SEMESTER

COURSE CODE / SUBJECT CODE & NAME: C401 / MG8591 / Principles of Management

C401.1	Demonstrate the basics of management and its types, skills, management roles; Differentiate types of business organizations and to examine organization culture and current trends in business
C401.2	Outline the nature and purpose of planning, Classify the types of planning, develop objectives, policies, planning premises and decision-making process.
C401.3	Compare the different organization structures – formal vs informal organization, line vs staff authority, centralization vs decentralization; design job attributes such as HR management, HR planning, Recruitment, selection, training, career planning etc.
C401.4	Criticize individual and group behavior, compare and explain the types and theories of leadership and motivation; Explain the communication process, examine the barriers in communication and propose an effective communication method
C401.5	Analyze and design various control process like budgetary control, non-budgetary control, use of IT in management control, direct control and preventive control.

COURSE CODE / SUBJECT CODE & NAME: C402 / CS8792 & Cryptography and Network Security

C402.1	Understand Cryptography Theories, Algorithms and Systems
C402.2	Understand the symmetric key approaches and evaluate the strength of the various techniques
C402.3	Apply the mathematical concept of asymmetric key cryptography in public key cryptography
C402.4	Apply various message authentication functions and secure algorithms.
C402.5	Demonstrate different levels of security through various applications and create protection mechanisms in order to secure computer networks.

COURSE CODE / SUBJECT CODE & NAME: C403 / CS8791 & Cloud Computing

C403.1	Discuss the concept of cloud computing.
C403.2	Explain the evolution of cloud from the existing technologies.
C403.3	Explain the various issues in cloud computing.
C403.4	Infer the lead players in cloud.
C403.5	Explain the emergence of cloud as the next generation computing paradigm.

COURSE CODE / SUBJECT CODE & NAME: CE405 / CS8091 / Big Data Analytics

CE405.1	Apply Big data tools and its analysis techniques.
CE405.2	Analyse data by utilizing clustering and classification algorithms.
CE405.3	Learn and apply different mining algorithms and systems for large volumes of data.
CE405.4	Perform analytics on data streams.
CE405.5	Implement NoSQL databases and management for real time applications

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COURSE CODE / SUBJECT CODE & NAME: CE405 / CS8082 / Machine Learning Techniques

CE405.1	Differentiate between supervised, unsupervised, semi-supervised machine learning approaches
CE405.2	Discuss the decision tree algorithm and indentify and overcome the problem of overfitting
CE405.3	Discuss and apply the back propagation algorithm and genetic algorithms to various problems
CE405.4	Apply the Bayesian concepts to machine learning
CE405.5	Analyse and suggest appropriate machine learning approaches for various types of problems

COURSE CODE / SUBJECT CODE & NAME: CE405 / CS8092 / Computer Graphics and Multimedia

CE405.1	Explain basic illumination and color models.
CE405.2	Discuss various 2D transformations, viewing and clipping techniques.
CE405.3	Explain the 3D objects and projections.
CE405.4	Explain various multimedia system design and file formats
CE405.5	Discuss various hypermedia techniques and 3D scenes.

COURSE CODE / SUBJECT CODE & NAME: CE405 / IT8075 & Software Project Management

CE405.1	Explain the software project evaluation techniques and planning
CE405.2	Demonstrate different software process models and cost estimation techniques
CE405.3	Outline the risk management process
CE405.4	Explain the need for Software Project Management and control
CE405.5	Summarize the organizational behavior and working in teams

COURSE CODE / SUBJECT CODE & NAME: CE405 / CS8081 / Internet of Things

CE405.1	Understand the concept of IoT
CE405.2	Analyze various protocols for IoT
CE405.3	Design a PoC of an IoT system using Raspberry Pi/Arduino
CE405.4	Apply data analytics and use cloud offerings related to IoT
CE405.5	Analyze applications of IoT in real time scenario

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COURSE CODE / SUBJECT CODE & NAME: CE405 / IT8074 / Service Oriented Architecture

CE405.1	Infer the XML schema, name spaces and document Structure.
CE405.2	Build application based on XML.
CE405.3	Outline the service oriented architecture principles and service layers.
CE405.4	Develop web services using SOAP and UDDI technologies.
CE405.5	Build SOA based applications for enterprises.

COURSE CODE / SUBJECT CODE & NAME: CE405 / GE8077 / Total Quality Management

CE405.1	Explain the Dimensions, Concepts and Barriers of TQM.
CE405.2	Discuss the TQM Principles.
CE405.3	Discuss the Tools utilization for Quality improvement.
CE405.4	Explain the various types of Techniques are used to measure Quality.
CE405.5	Apply various Quality Systems and Auditing on implementation of TQM.

COURSE CODE / SUBJECT CODE & NAME: CE406 / CS8083 & Multi-core Architectures and Programming

CE406.1	To understand the need for multi/core processors, architecture a, and their performance issues
CE406.2	To understand the challenges in parallel program and multi/threaded programming.
CE406.3	Apply and evaluate the Shared memory programming using OpenMP
CE406.4	Apply and evaluate the distributed memory programming performance using Message Passing Interface (MPI)
CE406.5	Analyze the parallel program implementation using OpenMP andMPI programs

COURSE CODE / SUBJECT CODE & NAME: CE406 / CS8079 / Human Computer Interaction

CE406.1	Interpret the computer devices and HCI models.
CE406.2	Demonstrate the interactive design basics and HCI software process
CE406.3	Identify the stake holders requirements and choose the appropriate models.
CE406.4	Develop mobile HCI using mobile elements and tools by considering mobile eco system.
CE406.5	Design meaningful user interface.

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COURSE CODE / SUBJECT CODE & NAME: CE406 / CS8073 / C# and .net Programming

CE406.1	Recognize basic programming in C# and the object oriented programming concepts.
CE406.2	write Windows applications, ADO.NET and ASP.NET
CE406.3	Use advanced concepts in data connectivity, WPF, WCF, and WWF with C# and .NET 4.5
CE406.4	Develop mobile applications using .Net compact framework
CE406.5	Understand the working of base class libraries, their operations and manipulation of data using XML.

COURSE CODE / SUBJECT CODE & NAME: CE406 / CS8088 / Wireless Adhoc and Sensor Networks

CE406.1	Understand the working of MAC and Routing Protocols for ad hoc and sensor networks
CE406.2	Understand Transport Layer protocols and their QoS for ad hoc and sensor networks.
CE406.3	Understand various security issues in ad hoc and sensor networks and the corresponding solutions.
CE406.4	Analyze protocols developed for ad hoc and sensor networks.
CE406.5	Understand various security issues in ad hoc and sensor networks and the corresponding solutions.

COURSE CODE / SUBJECT CODE & NAME: CE406 / CS8071 / Advanced Topics on Databases

CE406.1	Outline the transaction mechanisms parallel and distributed databases
CE406.2	Illustrate the design principles of Object RELATIONAL DATABASES
CE406.3	Explain about various Intelligent databases
CE406.4	Discuss the design principles of ADVANCED DATA MODELS
CE406.5	Infer various emerging databases such as XML, Cloud and Big Data

COURSE CODE / SUBJECT CODE & NAME: CE406 / GE8072 / Foundation Skills in Integrated Product Development

CE406.1	Summarize the global trends and Product Development Methodologies and Management.
CE406.2	Develop system design specification by applying requirement engineering to collect, analyze and arrive at requirements for new product development.
CE406.3	Develop product management plan including detailed design, prototype and testing for a new product based on the type of the new product and development methodology integrating the hardware, software, controls, electronics and mechanical systems.
CE406.4	Determine test specifications and product documentation to provide sustainance support up to the EoL (End of Life) for product verification and validation.
CE406.5	Appraise Product Development in Industry versus Academia and assess Innovation and Product Development process in the Business Context.

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COURSE CODE / SUBJECT CODE & NAME: CE406 / GE8074 / Human Rights

CE406.1	Explain the origin of Human rights and its classification (UN)
CE406.2	Explain in detail on Evolution and Theories of Human Rights (UN)
CE406.3	Analyze the performance of UN Agencies that monitors Human rights based on UN laws (Analyze)
CE406.4	Discuss on Indian Constitutional Provisions and Guarantees (UN)
CE406.5	Explain administrative tasks involved in implementing Human rights and for disabled people (UN)

COURSE CODE / SUBJECT CODE & NAME: CE406 / GE8071 / Disaster Management

CE406.1	Understand the exposure to disasters, their significance and types
CE406.2	Understand approaches of Disaster Risk Reduction (DRR)
CE406.3	Understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
CE406.4	Develop awareness of institutional processes in the country and rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity
CE406.5	Outline the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.

COURSE CODE / SUBJECT CODE & NAME: C407 / CS8711 & Cloud Computing Laboratory

C407.1	Show various virtualization tools such as Virtual Box, VMware workstation.
C407.2	Demonstrate the Design and deployment of web application in a PaaS environment.
C407.3	Produce the simulation of a cloud environment to implement new schedulers.
C407.4	Show the Installation and use a generic cloud environment that can be used as a private cloud.
C407.5	Manipulate large data sets in a parallel environment

COURSE CODE / SUBJECT CODE & NAME : C408 / IT8761 & Security Laboratory

C408.1	Apply the different substitution and transposition techniques
C408.2	Develop the Symmetric key Cryptographic technique using DES and AES algorithm
C408.3	Develop the asymmetric key cryptographic technique using RSA algorithm
C408.4	Demonstrate the Diffie/Hellman key exchange algorithm and message digest process
C408.5	Show the Digital signature for secure data transmission and Demonstrate vulnerability assessment tool and network security tool.

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IV YEAR / VIII SEMESTER

COURSE CODE / SUBJECT CODE & NAME: CE409 / EC8093 & Digital Image Processing

CE409.1	Understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms
CE409.2	Operate on images using the techniques of smoothing, sharpening and enhancement
CE409.3	Understand the restoration concepts and filtering techniques
CE409.4	Learn the basics of segmentation, features extraction and compression for color models.
CE409.5	Interpret the various image representation and recognition techniques.

COURSE CODE / SUBJECT CODE & NAME: CE409 / CS8085 & Social Network Analysis

CE409.1	To understand the concept of semantic web and related applications.
CE409.2	To learn knowledge representation using ontology.
CE409.3	To understand the concept of community mining algorithms
CE409.4	To understand human behavior in social web and related communities.
CE409.5	To learn visualization of social networks.

COURSE CODE / SUBJECT CODE & NAME: CE409 / IT8073 / Information Security

CE409.1	Understand the basic components of information security
CE409.2	Explain the legal, ethical, professional issues and security policies through security investigation
CE409.3	Analysis the various aspects of risk management and control mechanisms
CE409.4	Design the security architecture using various ISO security standards.
CE409.5	Demonstrate different aspects of security through various applications.

COURSE CODE / SUBJECT CODE & NAME: CE409 / CS8087 / Software Defined Networks

CE409.1	To evolve the fundamentals of software defined networks
CE409.2	To understand the separation of the data plane and the control plane by expressing the various components of SDN and their uses
CE409.3	To explain the use of SDN in the current networking scenario
CE409.4	To explain the SDN Programming with its tools and compositions
CE409.5	To design and develop various SDN application by using various SDN Framework.

COURSE CODE / SUBJECT CODE & NAME: CE409 / CS8074 & Cyber Forensics

CE409.1	Understand the basics of computer forensics
CE409.2	Apply a number of different computer forensic tools to a given scenario
CE409.3	Analyze and validate forensics data
CE409.4	Identify the vulnerabilities in a given network infrastructure
CE409.5	Implement real/world hacking techniques to test system security

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COURSE CODE / SUBJECT CODE & NAME: CE409 / CS8086 & Soft Computing

CE409.1	Illustrate the design fundamentals of various neural networks
CE409.2	Utilize fuzzy logic for decision making problems
CE409.3	Classify the various genetic algorithm
CE409.4	Explain hybrid soft computing techniques
CE409.5	Develop optimal solutions using soft computing approaches

COURSE CODE / SUBJECT CODE & NAME: CE409 / GE8076 & Professional Ethics in Engineering

CE409.1	Outline an awareness of Human values, to appreciate the rights of others and stress management.
CE409.2	Illustrate the moral issues and models of professional roles
CE409.3	Demonstrate code of Ethics
CE409.4	Discuss the Ethical issues related to engineering and realize the responsibilities and rights in the society.
CE409.5	Apply the social responsibility on multinational corporations related to engineering

COURSE CODE / SUBJECT CODE & NAME: CE410 / CS8080 & Information Retrieval

CE410.1	Understand the basic concept of information retrieval
CE410.2	Classify the modeling and retrieval evaluation
CE410.3	Apply appropriate method of classification or clustering
CE410.4	Design and implement innovative features in a web search engine
CE410.5	Design and implement a recommender system

COURSE CODE / SUBJECT CODE & NAME: CE410 / CS8078 & Green Computing

CE410.1	Acquire knowledge to adopt green computing practices to minimize negative impacts on the environment.
CE410.2	Enhance the skill in energy saving practices to minimize negative impacts on the environment
CE410.3	Evaluate technology tools that can reduce paper waste and carbon footprint by the stakeholders
CE410.4	Understand the issues related with green compliance
CE410.5	Understand the ways to minimize equipment disposal requirements

COURSE CODE / SUBJECT CODE & NAME: CE410 / CS8076 & GPU Architecture and Programming

CE410.1	Summarize the GPU architectures and memory models.
CE410.2	Design and develop CUDA programs and their optimization.
CE410.3	Examine error handling and debugging in CUDA programs.
CE410.4	Develop simple openCL programs and its execution and memory model.
CE410.5	Manipulate efficient parallel programming patterns to solve problems

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COURSE CODE / SUBJECT CODE & NAME: CE410 / CS8084 & Natural Language Processing

CE410.1	Recognize to tag a given text with basic Language features.
CE410.2	Design an innovative application using NLP components
CE410.3	Develop a rule based system to tackle morphology/syntax of a language.
CE410.4	Design a tag set to be used for statistical processing for real/time applications
CE410.5	Compare and contrast the use of different statistical approaches for different types of NLP applications

COURSE CODE / SUBJECT CODE & NAME: CE410 / CS8001 & Parallel Algorithms

CE410.1	Explain different parallel architectures and models of computation
CE410.2	Give the various classes of parallel algorithms
CE410.3	Examine parallel algorithms for basic problems
CE410.4	Develop parallel algorithms for standard problems and applications
CE410.5	Analyze efficiency of different parallel algorithms

COURSE CODE / SUBJECT CODE & NAME: CE410 / IT8077 & Speech Processing

CE410.1	Create new algorithms with speech processing
CE410.2	Derive new speech models
CE410.3	Perform various language phonetic analysis
CE410.4	Create a new speech identification system
CE410.5	Generate a new speech recognition system

COURSE CODE / SUBJECT CODE & NAME: CE410 / GE8073 & Fundamentals of Nano Science

CE410.1	Understand the motivation to introduce nano/science and nano/materials
CE410.2	Demonstrate the methods of preparation of nano/materials
CE410.3	Recall various types of nano materials
CE410.4	Understand the characterization analysis techniques of nano/material
CE410.5	Remember the applications of nano/science

COURSE CODE / SUBJECT CODE & NAME: C411 / CS8811 & PROJECT WORK

C411.1	Identify the problem by applying acquired knowledge.
C411.2	Analyze and categorize executable project modules after considering risks.
C411.3	Choose efficient tools for designing project modules.
C411.4	Combine all the modules through effective team work after efficient testing.
C411.5	Elaborate the completed task and compile the project report.