ARUNAI ENGINEERING COLLEGE

Velu Nagar, Thenmathur, Tiruvannamalai - 606603.
(Approved by AICTE, Affiliated by Anna University Chennai)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

REGULATION-2013

Course Outcomes

Semester - I	
Course code and Name	**Course Outcomes(CO)** **After completion of the course, the students will be able to**
C101-HS6151 TechnicalEnglish – I	**C101.1**Explain clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies. **C101.2** Construct cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic. **C101.3** Organize different genres of texts adopting various reading strategies. **C101.4** Distinguish and comprehend different spoken discourses/excerpts in different accents. **C101.5** Listen to different accents, speeches and presentations.
C102-MA6151 Mathematics I	**C102.1** Infer canonical form from quadratic form using the concepts of Eigen values and Eigen vectors. **C102.2** Test the convergence of sequences and series. **C102.3** Apply the techniques of differential calculus to find the evaluateand envelope of curves. **C102.4** Determine the maxima and minima of functions of two variablesusing partial derivatives. **C102.5** Find the area enclosed by plane curves and volume of solids usingmultiple integrals.
C103-PH6151 EngineeringPhysics-I	**C103.1** Describe the crystal structures and various crystal growth techniques. **C103.2** Analyze the elastic nature of materials and thermal behavior of materials. **C103.3** Apply the knowledge of quantum mechanics and Classical mechanics in addressing the problems related to science and technology. **C103.4** Apply the knowledge about designing an auditorium with good acoustical properties and make use of Ultrasonics and its applications in various fields. **C103.5** Illustrate the advantages of optical communication using LASER.

C104-CY6151 Engineering Chemistry-I	**C104.1** Describe the methods of polymerization, types, Properties and usesof polymers. **C104.2** Illustrate the concepts of basic thermodynamics and problem solving skills in various disciplines of Engineering. **C104.3** Discuss the laws of photochemistry in recognizing the interaction of light with matter and its applications in luminescence and spectroscopy. **C104.4** Review the use of phase rule in identifying its applications in metallurgy and alloys. **C104.5** Summarize the basic knowledge in Nano chemistry and distinguishthe existing technology with nanotechnology.
C105-GE6151 Computer Programming	**C105.1** Elaborate the organization of digital computer and design the solution for simple computing problems using algorithm, flowchart and pseudo code. **C105.2** Apply the different looping structure to solve simple scientific andstatistical problems. **C105.3** Devise the solutions for simple problems using arrays and strings **C105.4** Demonstrate the usage of dynamic memory allocation and pointer variables. **C105.5** Illustrate the concepts of structure and union with an example programs.
C106-GE6152 EngineeringGraphics	**C106.1** Sketch the conic sections, special curves, and draw orthographic views from pictorial views and models. **C106.2** Apply the principles of orthographic projections of points in allquadrants, lines and planes in first quadrant. **C106.3** Sketch the projections of simple solids like prisms, pyramids,cylinder and cone and obtain the traces of plane figures. **C106.4** Practice the sectional views of solids like cube, prisms, pyramids,cylinders & cones and extend its lateral surfaces. **C106.5** Sketch the perspective projection of simple solids, truncated prisms, pyramids, cone and cylinders and sketch the isometric projection of simple machine parts.
C107-GE6161 Computer PracticesLaboratory	**C107.1** Describe the usage of office automation tools **C107.2** Apply the good programming methods for program development. **C107.3** Design and implement the C program for simple application **C107.4** Develop and implement the recursive programs **C107.5** Implement the C program with the help of Structures and Union

C108-GE6261 EngineeringPractices Laboratory	**C108.1** Construct Electrical and Electronic circuits. **C108.2** Examine different types of electronic circuits and components. **C108.3** Recognize electrical safety rules, grounding, general house wiring. **C108.4** Explore soldering practices.
C109-GE6163 Physics and Chemistry Laboratory - I	**C109.1** The hands on exercises undergone by the students will help them to apply physics principles of optics and thermal physics to evaluate engineering properties of materials. **C109.2** Perform the quantitative chemical analysis of chloride and dissolved oxygen. **C109.3** Determine the amount of acids by using the instruments of conductivity meter and pH meter.
Semester II	
C110-HS6251 TechnicalEnglish – II	**C110.1** Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, argue using appropriate communicative strategies.. **C110.2** Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing. **C110.3** Read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation. **C110.4** Listen/view and comprehend different spoken excerpts criticallyand infer unspoken and implied meanings. **C110.5** Read and write effectively for a variety of professional and social settings
C111-MA6251 Mathematics – II	**C111.1** Apply the knowledge of vector calculus in engineering disciplines. **C111.2** Solve ordinary differential equations that model theengineering problems. **C111.3** Find the Laplace transform of functions and solve the ordinary differential equations using Laplace transform. **C111.4** Construct analytic functions and apply the knowledge of conformal mappings in engineering disciplines. **C111.5** Evaluate contour integration and apply it in engineering problems.

C112-PH6251 Engineering Physics – II	**C112.1** Describe the conducting materials and their properties. **C112.2** Analyze the semiconductors and able to differentiate various types of semiconductors. **C112.3** Apply the knowledge of magnetic and superconducting materials for modern day to day applications. **C112.4** Explain the properties and applications of dielectrics. **C112.5** Apply the knowledge about the modern engineering materials for various applications.
C113-CY6251 Engineering Chemistry – II	**C113.1** Describe water technology in the purification of water indomestic and industrial applications. **C113.2** Explain the principles of electrochemistry, the factors affectingcorrosion and the prevention of corrosion. **C113.3** Classify the different alternative sources of energy and thegeneration processes. **C113.4** Enumerate the different types of engineering materials andtheir applications. **C113.5** Discuss the industrial techniques of petroleum processing and the determination of calorific values and combustion parameters.
C114-CS6201 Digital Principlesand System Design	**C114.1** Analyze different methods used for simplification of Booleanexpressions **C114.2** Use Boolean simplification techniques to design a combinational hardware circuit and write HDL code for circuits. **C114.3** Design and analysis of a given synchronous sequential circuit. **C114.4** Implement an asynchronous sequential circuit design. **C114.5** Design digital circuits using PLD
C115-CS6202 Programming andData Structures I	**C115.1** Summarize the concept of arrays and pointers in C language. **C115.2** Illustrate the process of handling files and heterogeneous data types using C programs. **C115.3** Explain the operations of Abstract Data Type-Linked List withexamples. **C115.4** Apply the operations of Abstract Data Types-Stack and Queue with examples. **C115.5** Analyze different sorting, searching algorithms and hashing techniques.
C116-GE6262 Physics and Chemistry Laboratory - II	**C116.1** Ability to test materials by using their knowledge of appliedphysics principles in optics and properties of matter. **C116.2** Determine the hardness, alkalinity and metal ion content in thewater samples by volumetric titration. **C116.3** Estimate the water quality parameters by potentiometer, conduct meter and flame photometer.

C117-CS6211 Digital Laboratory	**C117.1** Apply Boolean simplification techniques to design acombinational hardware circuit **C117.2** Design and Implement combinational and sequential circuits. **C117.3** Analyze a given digital circuit – combinational and sequential. **C117.4** Design the different functional units in a digital computer system. **C117.5** Design and Implement a simple digital system.
C118-CS6212 Programming andData Structures Laboratory I	**C118.1** Design and implement C programs for implementing stacks,queues, and linked lists. **C118.2** Apply good programming design methods for program development. **C118.3** Apply the different data structures for implementing solutions to practical problems. **C118.4** Develop searching and sorting programs. **C118.5** Develop and Test C programs to implement non-linear data structures
Semester III	
C201-MA6351Transforms andPartial Differential Equations	**C201.1** Solve the Partial Differential Equations. **C201.2** Determine the Fourier series expansion of functions and hence evaluate the value of infinite series. **C201.3** Apply the method of separation of variables to solve one dimensional wave equation, one dimensional heat equation and two dimensional heat equation. **C201.4** Find the Fourier transform of functions and also evaluate definiteintegrals using Fourier transform. **C201.5** Calculate the Z-transform of discrete time systems and solve thedifference equations using Z-transform.
C202-CS6301 Programming andData Structure II	**C202.1** Explain the basic concepts of Object Oriented programming. **C202.2** Apply the concepts of polymorphism, inheritance and virtualfunctions for problem solutions. **C202.3** Explore the generic problem solution, standard libraries withrequired errors by means of exception handling. **C202.4** Comprehend the usage of different advanced nonlinear datastructure - Set, Heaps and Height balanced trees. **C202.5** Apply the non-linear data structure graph in solving the real World problems.
C203-CS6302 Database Management Systems	**C203.1** Explore the basic concepts of Database Management system. **C203.2** Create database using query languages. **C203.3** Explain the concepts of transaction processing and concurrency control. **C203.4** Explore and gain the knowledge on internal storage Structure andindexing techniques. **C203.5** Relate security concepts to databases.

C204-CS6303 Computer Architecture	**C204.1** Describe the operations and Instructions in "Microprocessor without Interlocked Pipeline Stages" (MIPS) architecture. **C204.2** Model arithmetic and logic unit including Floating Point Multiplication and Division Algorithms. **C204.3** Develop MIPS architecture by building pipelined data path and control path. **C204.4** Analyze pipelined control units with Instruction Level Parallelism. **C204.5** Classify the performance of different Memory and Input-Outputsystems.
C205-CS6304 Analog and DigitalCommunication	**C205.1** Apply various analog communication techniques in all communication systems. **C205.2**Apply various digital communication techniques in all communication systems. **C205.3** Use data and pulse modulation techniques for lighting applications. **C205.4** Apply Source and Error control coding in both wired and wirelesscommunication systems. **C205.5** Utilize of multi-user radio communication systems.
C206-GE6351 Environmental Science and Engineering	**C206.1** Summarize the importance of public awareness on environment and nature of biodiversity. **C206.2** Describe the various causes, effect and control measures of environmental pollution. **C206.3** Discuss the human development that leads to environmental disasters, the value of natural resources and their conservation. **C206.4** Explain the value of public participation in environmental protection, Environmental Management and Legislation Acts and sustainable development. **C206.5** Review the problems related to population and their remedial measures.
C207-CS6311 Programming and Data Structure Laboratory II	**C207.1** Develop C++ programs using the concepts of abstraction, encapsulation, constructor, polymorphism, overloading and inheritance for solving problems. **C207.2** Design and implement C++ programs for manipulating stacks, queues, linked list, tress and graphs. **C207.3** Apply the different data structures for realizing solutions to practical problems. **C207.4** Develop recursive programs using trees and graphs.
C208-CS6312 Database Management Systems Laboratory	**C208.1** Design and implement a database schema for a given problem-domain. **C208.2** Populate and query a database. **C208.3** Build and maintain tables using PL/SQL. **C208.4** Implement the database triggers and functions.

Semester IV	
C211-MA6453 Probability andQueuing Theory	**C211.1** Apply the knowledge of probability distributions to tackle real life problems, in particular, analyzing the performance of computer systems. **C211.2** Model and analyze two dimensional random variable problems. **C211.3** Characterize phenomenon which evolve with respect to time ina probabilistic manner. **C211.4** Characterize the Markovian queueing system. **C211.5** Apply the knowledge of Non-Markovian queuing models and queuing networks in solving problems in computer scienceengineering.
C212-CS6551 ComputerNetworks	**C212.1** Describe the Network fundamentals and terminology **C212.2** Recognize the different internetworking devices and their functions **C212.3** Explore the network with routing and multicasting **C212.4** Explain the detailed inner workings of TCP/IP protocol suit. **C212.5** Analyze the features and operations of various application layerprotocols such as HTTP, DNS, and SMTP.
C213-CS6401 Operating Systems	**C213.1** Summarize the basic concepts, System call, structure and functions of Operating Systems. **C213.2** Design the various Scheduling algorithms, Deadlock prevention, Deadlock avoidance algorithms and apply the principles of concurrency. **C213.3** Demonstrate the usage of various memory management schemes. **C213.4** Encapsulate the concepts of Mass Storage Structure, File System Structure and I/O Systems. **C213.5** Implement administrative tasks on Linux servers.
C214-CS6402 Design and Analysis of Algorithms	**C214.1** Describe the fundamentals of algorithmic problem solving andable to analyze recursive and non-recursive algorithms. **C214.2** Design algorithms for various computing problems using bruteforce and divide-and conquer technique. **C214.3** Analyze the time and space complexity of various algorithmsusing dynamic programming and greedy technique. **C214.4** Analyze the different algorithm design techniques for a givenproblem using iterative improvement. **C214.5** Modify existing algorithms to improve efficiency.
C215-EC6504 Microprocessorand Microcontroller	**C215.1** Design and implement programs on 8086 microprocessor. **C215.2** Implement the system bus structure of 8086 and coprocessor. **C215.3** Describe the I/O devices, peripherals and bus interfacing. **C215.4** Elaborate the operation of 8051 microcontroller architecture andimplement ALP using 8051 instructions. **C215.5** Design and implement 8051 microcontroller based systems.

C216-CS6403 Software Engineering	**C216.1** Describe the purpose and facts of different software development process models with an insight into generic process framework. **C216.2** Identify the functional and non-functional requirements for software development by preparing IEEE Software Requirements Document. **C216.3** Express software design activities using data flow diagrams and architectural diagrams. **C216.4** Develop a testing framework by understanding the purposes andstages of software testing and test-driven development. **C216.5** Explain the project management activities involved in developing a framework including planning, scheduling, risk assessment/management.
C217-CS6411 Networks Laboratory	**C217.1** Describe the usage of socket programming and client servermodel. **C217.2** Implement the different protocols and network commands. **C217.3** Design and implement the application using TCP concepts. **C217.4** Implement the algorithms with the help of Network Simulator.
C218-CS6412 Microprocessorand Microcontroller Laboratory	**C218.1** Write ALP Programs for fixed and Floating Point and Arithmetic. **C218.2** Interface different I/O with 8086 processor. **C218.3** Generate waveforms using 8086 processors. **C218.4** Write and Execute ALP Programs in 8051. **C218.5** Explain the difference between Simulator and Emulator
C219-CS6413 Operating SystemsLaboratory	**C219.1** Use the basics of shell programming. **C219.2** Use the System calls and implement in C programming. **C219.3** Apply the file system related system calls. **C219.4** Create processes and implement IPC. **C219.5** Compare the performance of various CPU Scheduling Algorithm, Implement deadlock avoidance, and Detection Algorithms.
Semester V	
C301-MA6566 Discrete Mathematics	**C301.1** Describe the concepts needed to test the logic of a program. **C301.2** Identify the structures on many levels and be aware of the counting principles. **C301.3** Explain graph terminology and special types of graphs. **C301.4** Illustrate the concepts and properties of algebraic structures suchas groups, rings and fields **C301.5** Explain the concepts of Lattices and Boolean algebra.

C302-CS6501 Internet Programming	**C302.1** Implement Java programs. **C302.2** Create a basic website using HTML and Cascading StyleSheets. **C302.3** Design and implement client side programs using JavaScriptand server side programs using Servlets and JSP. **C302.4** Design and implement simple web page in PHP, and to presentdata in XML format. **C302.5** Design rich client presentation using AJAX and Implement web services.
C303-CS6502 Object OrientedAnalysis and Design	**C303.1** Use the UML analysis and design diagrams. **C303.2** Interpret and use the GRASP design patterns and GoF Designpatterns. **C303.3** Analyze and design use case modeling and domain modeling. **C303.4** Apply appropriate design patterns. **C303.5** Design and implement projects using Object Oriented conceptsand compare various testing techniques.
C304-CS6503 Theory of Computation	**C304.1** Construct a minimized finite automaton to recognize a givenregular language. **C304.2** Describe formal relationships among machines, languages andgrammars. **C304.3** Construct the pushdown automata for all the context free language. **C304.4** Discuss the basic properties of Turing Machines and Techniques for turing machine construction. **C304.5** Explain the decidability or Un-decidability of various problems.
C305-CS6504 Computer Graphics	**C305.1** Describe the graphics hardware devices, software used anddifferent drawing algorithms. **C305.2**Apply two dimensional transformations and clipping techniques to graphical objects. **C305.3** Design three-dimensional graphical objects and apply three-dimensional transformations into graphical objects. **C305.4** Explain the illumination and color models. **C305.5** Design an animation sequences.
C306-CS6511 Case Tools Laboratory	**C306.1** Design and implement projects using Object Oriented concepts. **C306.2** Use the UML analysis and design diagrams. **C306.3** Apply appropriate design patterns **C306.4** Create code from design **C306.5** Compare and contrast various testing techniques.
C307-CS6512 Internet Programming Laboratory	**C307.1** Design user interfaces using Java frames and applets. **C307.2** Design Web pages using HTML/XML and style sheets. **C307.3** Develop dynamic web pages using server side scripting and write client server applications. **C307.4** Use the frameworks like JSP Strut, Hibernate, Spring. **C307.5** Create applications with AJAX and web services.

C308-CS6513 Computer Graphics Laboratory	**C308.1** Explain the basics of graphics programming. **C308.2** Create 2D animations. **C308.3** Implement image manipulation and enhancement. **C308.4** Create 3D graphical scenes using open graphics library suits.
Semester VI	
C311-CS6601Distributed Systems	**C311.1** Describe the trends and challenges in distributed system **C311.2** Apply network virtualization, remote method invocation andobjects. **C311.3** Demonstrate peer-to-peer services and distributed file system. **C311.4** Analyze the issues related to scalability, synchronization, Transaction processing, concurrency and reliability in distributed system. **C311.5** Design process and resource management systems.
C312-IT6601Mobile Computing	**C312.1** Describe the basic concepts of mobile computing and MACprotocol. **C312.2** Choose the required functionality at each layer for givenapplication. **C312.3** Explain the basics of mobile telecommunication systems. **C312.4** Design Ad hoc networks. **C312.5** Develop a mobile application.
C313-CS6660 Compiler Design	**C313.1** Summarize the basic concepts of compiler and its phases. **C313.2** Implement the functionalities of lexical analysis phase like conversion of regular expression to DFA and minimization of DFA. **C313.3** Design the parsing table using different parsing techniques anddifferent compiler construction tools. **C313.4** Explain the translation process and run time environmentissues. **C313.5** Apply the various optimization techniques for effectively generating machine code.
C314-IT6502 Digital SignalProcessing	**C314.1** Analyze the properties of discrete time signal and properties ofsystems using Z-transform. **C314.2** Apply the concepts of frequency transformations like DFT,FFT and DCT in analysis of various signals and systems **C314.3** Design Infinite Impulse response (IIR) digital filters. **C314.4** Design Finite Impulse response (FIR) digital filters. **C314.5** Analyze the finite Word length effects in digital filters.
C315-CS6659 Artificial Intelligence	**C315.1** Identify appropriate AI methods to solve a problem using searchtechnique. **C315.2** Demonstrate the knowledge in predicate and propositional logic and their roles in logic programming. **C315.3** Formalize a given problem in the language / framework of different AI methods. **C315.4** Apply the machine learning techniques in solving the real-world problems. **C315.5** Elucidate the idea of Knowledge Acquisition and ExpertSystems.

C316-CS6001 Total Quality Management	**C316.1** Describe the major elements of .NET Framework, C# language, and develop programs in using C# on .NET. **C316.2** Comprehend the usage of Inheritance, Interfaces, Operatoroverloading, abstract class and exception for problem Solving. **C316.3** Design, Debug, compile and run an application with databaseconnectivity using ADO .NET. **C316.4** Design and develop Web based applications on NET. **C316.5** Explain the concepts of CLR and .NET framework
C317-CS6611 Mobile ApplicationDevelopment Laboratory	**C317.1** Explain the architecture of mobile applicationdevelopment frameworks. **C317.2** Choose the required architecture based upon the mobile application to be developed. **C317.3** Design mobile applications using various layout and widgets. **C317.4** Implement various mobile applications using emulators. **C317.5** Deploy applications to hand-held devices.
C318-CS6612 Compiler Laboratory	**C318.1** Explain and Use the compiler writing tools. **C318.2** Implement the different Phases of compiler using tools. **C318.3** Analyze the control flow and data flow of a typical program. **C318.4** Optimize a given program. **C318.5** Generate an assembly language program equivalent to asource language program.
C319-GE6674 Communicationand Soft Skills - Laboratory Based	**C319.1** Identify and interpret visuals, communicate in formal and informal conversations, give presentations, and participate in GD. **C319.2** Explain reading comprehension passages of higher levels, draft Resume, cover letter, reports, emails, and write blogs. **C319.3** Differentiate between IELTS & TOEFL and takeplacement oriented verbal ability tests. **C319.4** Demonstrate appropriate verbal, non-verbal and paralinguistic
Semester VII	
C401-CS6701 Cryptography andNetwork Security	**C401.1** Interpret the basic concepts, OSI security architecture,finite fields and number theory. **C401.2** Compare the various Cryptographic techniques. **C401.3** Determine the usage of hash functions and digital signature. **C401.4** Design the various secure applications. **C401.5** Inject secure coding in the developed applications.

C402-CS6702 Graph Theory andApplications	**C402.1** Writeprecise and accurate mathematical definitions of objects in graph theory. **C402.2** Use mathematical definitions to identify and construct examples of spanning trees and planar graphs. **C402.3** Validate and critically assess a mathematical proof in graphs and digraphs. **C402.4** Apply the techniques of permutations and combinationsand Binomial theorem for solving problems in Engineering **C402.5** Construct and solve generating functions, homogeneous and non- homogeneous recurrence relations.
C403-CS6703 Grid and CloudComputing	**C403.1** Describe the architecture of Grid and Cloud Computing. **C403.2** Apply the knowledge to solve the large-scale problem in grid computing. **C403.3** Explore the concepts of Virtualization. **C403.4** Develop the web services using the grid and cloudtechnologies. **C403.5** Apply security mechanism in grid and cloud computing.
C404-CS6704 Resource Management Techniques	**C404.1** Apply the knowledge of linear programming problems in engineering disciplines **C404.2** Solve LPP using dual simplex method, transportation and assignment problems **C404.3** Apply integer programming to solve real life problems **C404.4** Solve problems in classical optimization theory **C404.5** Use PERT and CPM for problems in project management.
C405-IT6801 Service OrientedArchitecture (E-I)	**C405.1** Develop a simple XML document coding andXML Schema. **C405.2** Create an application based on XML and database. **C405.3** Compare the characteristics and principles of Service orientedarchitecture with client server and distributed architecture. **C405.4** Describe the web services using WSDL, SOAPand UDDI. **C405.5** Build a Service oriented architecture based applications For Intra-enterprise and inter- enterprise applications using J2EE.

C406-IT6006 Data Analytics(E-II)	**C406.1** Apply the statistical analysis methods. **C406.2** Compare and contrast various soft computing frameworks and learn efficient algorithms for mining the data from large volumes. **C406.3** Apply Stream data model. **C406.4** Perform various association mining and clustering techniques for extracting information from data. **C406.5** Design distributed file systems and perform visualization.
C407-CS6711 Security Laboratory	**C407.1** Implement the cipher techniques **C407.2** Develop the various security algorithms **C407.3** Use different open source tools for network security and analysis. **C407.4.** Use different Wire shark tools for network security and analysis
C408-CS6712 Grid and CloudComputing Laboratory	**C408.1** Develop application using Globus toolkit. **C408.2** Develop web services/application using Grid framework **C408.3** Run Virtual machine and install software on it. **C408.4** Setup a private cloud using OpenStack / Open Nebula / Ecualyptus **C408.5** Implement applications using MapReduce approach in Hadoop environment.
Semester VIII	
C410-CS6801 Multi –CoreArchitectures and Programming	**C410.1** Describe the parallel architecture and parallel programmingmodel **C410.2** Analyze the issues related to various challenges in parallel programming **C410.3** Develop parallel programming applications using openMP **C410.4** Design and develop distributed programming application usingopenMPI. **C410.5** Compare and analyze the programming model for serial processor and parallel processor implementation.
C412-CS6008 Human ComputerInteraction (Elective)	**C412.1** Explain the basic foundations of Human Computer Interaction. **C412.2** Design effective HCI for individuals and persons withdisabilities. **C412.3** Simplify the issues in the HCI Models and assess the importance of user feedback **C412.4** State the Mobile HCI implications for designing multimedia/ ecommerce/ e-learning Web sites. **C412.5** Develop the meaningful user interface.
C411-GE6075 Software Project Management	**C411.1** Understand Project Management principles while developing Software. **C411.2** Gain extensive knowledge about the basic project management concepts, framework and the process models **C411.3** Obtain adequate knowledge about software process models and software effort and risk estimation techniques.

	C411.4 Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project Management principles. **C411.5** Learn staff selection process and the issues related to people management.
CS413-CS6811 PROJECT WORK	**C413.1** Apply the fundamental knowledge and skills, Which are acquired within the technical area, to a given problem **C413.2** Identify and summarize an appropriate list of literature review,analyze previous researchers' Work and relate them to the project. Within given constraints, even with limited information, the students will be able to independently analyze and discuss complex inquiries/problems and handle larger problems on the advanced level within the technical area. **C413.3** Design engineering solutions to complex problems in a systematic approach. Identify and apply appropriate parameters, assumptions and design criteria in consideration of health and safety (example: the use of codes of practice), ethics, economics, environment, sustainability. **C413.4** Apply research and conduct experiments, as well as to analyze and interpret data that yield the results and answer important applicable research questions. **C413.5** Utilize technology tools for communication, collaboration, information management, and decision support. **C413.6** Demonstrate the knowledge, skills and attitudes of a professional engineer. **C413.7** Interact with team members in a professional manner, respecting differences, to ensure a collaborative project environment. **CO413.8** Demonstrate a strong working knowledge of ethics and professional responsibility. **C413. 9** Document and present one's own work, for a given target group, with strict requirements on structure, format, and language usage. **C413.10** Present the project outlining the approach and expected resultsusing good oral and written presentation skills. **C413.11** Demonstrate effective organizational leadership and change skills for managing projects and project teams. **C413.12** Recognize the need for life-long learning by undergoing the project work.