

**BVC ENGINEERING COLLEGE::ODALAREVU (AUTONOMOUS)**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**Vision**

To become a leading technical institute of academic excellence by imparting high patterns of discipline through innovative programmes of global standards making our students technologically superior and ethically strong to serve the nation

**Mission**

To create an environment that shall foster the growth of intellectually capable, innovative professionals who can contribute to the to the growth of technology in partnership with industry and develop and harness it for the welfare of the nation and mankind.

**Vision of CSE department**

To make the students technically and communicationally strong to produce globally competent graduates with innovative idea and ethics to build a vibrant nation.

**Mission of CSE department**

To provide good infrastructure, technology know how in collaboration with software industry, student internship, training by corporate experts, undertaking real time projects, also exposing the students to workshops and motivational programs.

**(A) PROGRAMME EDUCATIONAL OBJECTIVES:**

**P1** BVC Graduates shall have strong foundation in basic sciences, mathematics, engineering fundamental and in computer science engineering subjects in addition to proficiency to computer programming and use of modern tools and technologies.

**P2:** BVC Graduates will be successfully engaged in careers in software and hardware and allied fields as eminent engineers and managers.

**P3:** BVC Graduates will be prepared for continued professional development through postgraduate studies in engineering and allied fields and through life-long learning.

**P4:** BVC Graduates will have demonstrated practices and skills in professional attitude, teamwork, leadership, values, ethics and communication.

**(B) PROGRAM OUTCOMES (POs)**

## **Engineering Graduates will be able to:**

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

## **(C) PROGRAM SPECIFIC OUTCOMES (PSOs)**

- 1. Solutions to real world problem:** Associate learning of Data Science, Network security ,Big Data, IOT to arrive solution to real world problem.
- 2. Use of open source modern design tools:** improve capability to comprehend the technological advancements in the usage of open source modern design tools to analysis, design subsystem process for variety applications.

**COURSE OUTCOMES(2017-2018)**

Code	I Year – I SEMESTER
C111	ENGLISH-I
C112	MATHEMATICS-I
C113	MATHEMATICS -II
C114	APPLIED PHYSICS
C115	COMPUTER PRORAMMING
C116	ENGINEERING DRAWING

**Course Name:** ENGLISH-1 (C111)

**Year of Study: 2017-18**

Student is able to

C111.1	Develop their knowledge on different fields to serve the society
C111.2	Improve reading , writing and communication skills
C111.3	Get awareness on safety measures for transportation, for labs and industries, safety measures against different varieties of accidents at home and in the workplace.
C111.4	Know the various technology
C111.5	Develop complete knowledge on source of energy as alternatives to the depleting sources
C111.6	Get concrete idea on preservation of Environment for a better tomorrow

**Course Name:** MATHEMATICS-1 (C112)

**Year of Study: 2017-18**

Student is able to

C112.1	solve differential equations of first order and first degree and its applications in mathematical models.
C112.2	apply the linear differential equations in the study of Electrical and Mechanical oscillatory system
C112.3	use Laplace Transform to find the particular solution without finding the general solution
C112.4	know maxima and minima of functions of two and three variables

C112.5	use in min/max optimization analysis in the study of CFD (Computational Fluid Dynamics) simulations.
C112.6	Identify and classify solving different types of P.D.E

**Course Name: MATHEMATICS-II (C113)**

**Year of Study: 2017-18**

Students are able to

C113.1	Calculate a root of algebraic and transcendental equation, explains relation between the finite difference operators
C113.2	practice Computer interpolation polynomial for the given data
C113.3	Solve ordinary differential equations numerically using Euler and RK method.
C113.4	demonstrate Fourier series useful to solve ordinary and partial differential equations and applications.
C113.5	use the applications such as The equation of heat conduction, wave equation and two dimensional wave equation
C113.6	use Z transformations and demonstrate convolutions

**Course Name: APPLIED PHYSICS (C114)**

**Year of Study: 2017-18**

C114.1	Students are able to analyze interference and working details of interferometer
C114.2	Student can know the difference between Fresnel and Fraunhofer diffraction effects and application
C114.3	Student can learn types of polarization, working principle of Nicol's prism
C114.4	Student will be able to analyze electromagnetic waves through dielectric medium
C114.5	Student came to know about quantum mechanics and their application in explanation microscopic physical system by solving Schrodinger wave equation

C114.6	Student will able to practice and use and know the concept electrons and holes in intrinsic and extrinsic semi conductors principles and how the concentration and conductivity effects with temperature
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**Course Name:**            **COMPUTER PROGRAMMING (C115)**            **Year of Study: 2017-18**

C115.1	Students are able to identify and assemble Computer Hardware , able to install software , Assembly language, high level language, compiler and assembler , Algorithm & flow chart
C115.2	Students are able to make use of concept of C character set identifiers, keywords, data type , sizes, variable names, declaration statements, operators, type conversion
C115.3	Students are able to use Flow of Control and program Structure for decision making.
C115.4	Students are able to apply built in functions and implementation of user defined functions
C115.5	Students are able to demonstrate concept of arrays and strings
C115.6	Students are able to use concept of Pointers, Structures , Union and Files

**Course Name:**            **ENGINEERING DRAWING (C116)**            **Year of Study: 2017-18**

Students are able to

C116.1	Get the information about the important tools of engineering drawing. This will give the students basic knowledge of technical drawing and means of communications to others.
C116.2	Learn how to draw the shapes, angles, lines and others which are essential for engineer.
C116.3	Familiarize with different drawing equipment, technical standards and procedures for construction of geometric figures. This will give the students ability to draw the two dimensional objects on the paper and to draw the pictorial drawings.
C116.4	draw main idea of using the dimensions for engineering drawing.
C116.5	Develop student's imagination and ability to represent the shape, size and specifications of engineering objects.
C116.6	draw and analyze the principle of projections and to get the ability to objects by looking at its views.

SNO	Code	I Year – II SEMESTER
1	C121	ENGLISH-II

2	C122	MATHEMATICS-III
3	C123	APPLIESD CHEMISTRY
4	C124	OOPC++
5	C125	ENVIRONMENTAL SCIENCE
6	C126	ENGINEERING MECHANICS

**Course Name: ENGLISH - II (C121)**

**Year of Study: 2017-18**

**Students will be able to**

C121.1	The aim of education to enhance wisdom
C121.2	Promote peaceful co existence and harmony among people and society
C121.3	manage different cultural shocks due to globalization.
C121.4	Provide inspiration to the readers to make their own contributions to science and technology, and strengthen the nation.
C121.5	protect environment for the sustainability of the future generations.
C121.6	Enable the student for creative thinking

**Course Name: APPLIED CHEMISTRY (C122)**

**Year of Study: 2017-18**

**Students are able to**

C122.1	Prepare and analyze the properties and applications of polymers
C122.2	Analyze and apply effective use of fuels and explosives
C122.3	explain the latest techniques of corrosion prevention in our day to day life
C122.4	use the latest techniques of nano materials in our day to day life
C122.5	Find the cause of hard water
C122.6	Analyze engineering materials and fuel cells

**Course Name: MATHEMATICS-III (C123)**

**Year of Study: 2017-18**

**Students are able to**

C123.1	Describe the rank, Eigen values and eigen vectors of a given matrix
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C123.2	Solve simultaneous linear equations numerically using various matrix methods
C123.3	Calculate the gradient of scalar functions divergence and curl of a vector function
C123.4	Determine line, surface and volume integral
C123.5	Apply green's gauss and stokes's theorem to calculate line, surface and volume integral
C123.6	Determine double integral over regions and triple integral over a volume

**Course Name: OOPS (C124)**

**Year of Study: 2017-18**

C124.1	Students are able to differentiate between object oriented programming and procedural oriented languages
C124.2	Students are able to acquire knowledge on Classes , Objects ,Constructors and Destructor
C124.3	Students are apply Operator Overloading , Type Conversion & Inheritance
C124.4	Students are able to use Pointers & Binding Polymorphisms and Virtual Function
C124.5	Students are able to acquire knowledge on Generic Programming with Templates & Exception Handling
C124.6	Students are able to utilize the Standard Template Library

**Course Name: ENVIRONMENTAL SCIENCE (C125)**

**Year of Study: 2017-18**

C125.1	The Students will able to analyze eco system and its fuction in the environment.
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C125.2	The Student able to analyze and make correct use of natural resources.
C125.3	The Student gain knowledge of how to conserve the biodiversity and value of biodiversity.
C125.4	The Student gain the knowledge of how to control of various pollutions.
C125.5	The Students got the conceptual knowledge about social issues and the environment and gain knowledge about environmental legislations of India towards sustainable development
C125.6	The Students have knowledge on the concepts of environmental assessment and the stages involved in EIA and the environmental audit.

**Course Name: ENGINEERING MECHANICS (C126) Year of Study: 2017-18**

C126.1	The students are to be able to do resolution of system of forces, friction and its application, analysis of trusses.
C126.2	The students are able to find equilibrium conditions of rigid body for concurrent and non-concurrent force system, application of free body diagrams.
C126.3	The students are able to calculate to concepts of centroid and centre of gravity for different sections
C126.4	The students are able to calculate to properties of lines, areas and concepts of moment of inertia and polar moment of inertia including transfer formulae and their applications to different sections.
C126.5	The students are able to demonstrate motion of a particle in straight line and in curvilinear paths (projectiles), its velocity and acceleration computation and methods of representing plane motion.
C126.6	The students are able to calculate to concepts of work, types of energy its relation to particle motion, impulse-momentum equation of the particle in motion.

**Name of the Faculty: N. ANAND KUMAR**

**Course Name: ENGLISH COMMUNICATION SKILLS LAB - II (C127)**

**Year of Study: 2017-18**

C127.1	The unit makes the learner defendable and socially talkative with organized ideas and thoughts.
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C127.2	This unit turns the learners as effective communicators in terms of submitting the facts and data with polite interruption.
C127.3	This unit support the learner for being an effective presentator in their profession and structurally well in presenting in things.
C127.4	This unit encourages the learners for being update with tools needed to attend the interview.
C127.5	This unit strengthens the learners art of E-mailing and CV writing to suit with global needs of a profession.
C127.6	This unit makes the learners benefitted in (speaking and writing) using stranded variety of language syntactically and functionally.

**Academic Year: 2017-18**

**SUBJECT : OOPS LAB(129)**

C129.1	Students should be able to write the programs using control flow statements
C129.2	Students will able to use functions in cpp
C129.3	Students should be able to design programs using classes, objects.
C129.4	Students should be able to design programs using operator overloading
C129.5	Students should be able to write programs using inheritance ,polymorphism
C129.6	Students should be able to design programs using Standard Template Library

**Academic Year: 2017-18**

**SUBJECT : APPLIED CHEMISTRY LAB**

**CLASS : I-II CSE**

C128.1	Students gain knowledge on volumetric analysis
C128.2	Students are able to demonstrate Acid - Base Titration.
C128.3	Students able to do Redox titration.
C128.4	Students can demonstrate precipitate Reactions.

C128.5	Students obtain knowledge on Conductometric titration.
C128.6	Students are able to analyze complexometric titration.

Code	II Year – I SEMESTER
C211	Statistics with R Programming
C212	Mathematical Foundations of Computer Science
C213	Digital Logic Design
C214	Python Programming
C215	Data Structures through C++
C216	Computer Graphics
C217	Python Programming Lab
C218	Data Structures Lab

**Course Name: Statistics with R Programming (C211)**

**Year of Study: 2017-18**

<b>C211.1</b>	Able to write application of R programming for Statistical Analysis
<b>C211.2</b>	Able to explain about data structures of R programming
<b>C211.3</b>	Able to write the R functions to perform mathematical operations
<b>C211.4</b>	Able to write the R functions to perform Graphical presentation operations
<b>C211.5</b>	To write the R functions to perform Statistical operations
<b>C211.6</b>	To write the R functions to perform Regression operations

**Course Name: Mathematical Foundations of Computer Science (C212)**

**Year of Study: 2017-18**

C212.1	Students will be able to explain concept of discrete mathematics, mathematical logic, truth tables, well formed formula, normal forms and tautology.
C212.2	Students will be able to explain set theory, relations and Hasse diagrams.

C212.3	Students will be able to write algebraic structures and number theory.
C212.4	Students will be able to explain concept of permutations and combinations.
C212.5	Students will be able to write concept of recurrence relations.
C212.6	Students will be able to explain graph theory.

**Course Name: Digital Logic Design (C213)**

**Year of Study: 2017-18**

C213.1	Students are able to explain how the information is stored in digital system
C213.2	Students are able to design Boolean expression by using Boolean Algebra
C213.3	Students are able to write the map method to simplify Boolean expression
C213.4	Students are able to explain the procedure for designing combinational logic circuits
C213.5	Students are able to explain the procedure for designing clocked sequential circuits
C213.6	Students are able to explain components of sequential circuits

**Course Name: PYTHON PROGRAMMING (C214)**

**Year of Study: 2017-18**

<b>C214.1</b>	Describe the need of basics of python programming
<b>C214.2</b>	Students are able to explain the operators and apply decision and repetition structures in python
<b>C214.3</b>	Demonstrate the use of python lists, tuples and data structures
<b>C214.4</b>	Implement functions and modules, packages to improve readability of program
<b>C214.5</b>	Describe and apply object oriented programming methodology and concepts
<b>C214.6</b>	Demonstrate the GUI, turtle graphics and illustrate test cases in python.

**Course Name: Data Structures through C++ (C215)**

**Year of Study: 2017-18**

<b>C215.1</b>	Students are Able to identify the Appropriate Data Structure for the given problem
<b>C215.2</b>	Student will be able to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures
<b>C215.3</b>	Students will be to write linear and non-linear data structures like stacks, queues, linked list etc.,

<b>C215.4</b>	Students are able to identify shortest path in the graphs using various algorithms.
<b>C215.5</b>	Students are able to apply different pattern matching algorithms for searching the required string in the text.
<b>C215.6</b>	Students will be applying advanced data structures strategies for exploring complex data structures.

**Course Name: COMPUTER GRAPHICS (C216)**

**Year of Study: 2017-18**

<b>C216.1</b>	Identify software and hardware components of graphics system
<b>C216.2</b>	Able to explain basics of OpenGL and able to write OpenGL programs
<b>C216.3</b>	Able to implement graphics programs with input interaction using mouse and keyboard
<b>C216.4</b>	Able to explain concept of geometrical transformations, coordinate system and frames used in graphic system
<b>C216.5</b>	Understand rendering, lighting and shading techniques
<b>C216.6</b>	Design and implement graphics application using OpenGL

<b>Code</b>	<b>II Year – II SEMESTER</b>
C221	Java Programming
C222	Software Engineering
C223	Advanced Data Structures
C224	Computer Organization
C225	<b>Formal Languages and Automata Theory</b>
C226	Principles of Programming Languages
C227	Java Programming Lab
C228	Advanced Data Structures Lab

**Academic Year: 2017-18 II SEM**

**SUBJECT : JAVA PROGRAMMING (C222)**

**CLASS : II CSE**

<b>C222.1</b>	Students are able to explain basics of Object Oriented Programming
<b>C222.2</b>	Students are able to explain the concept of object, class, and this keyword
<b>C222.3</b>	Students are able to explain the concepts of inheritance, exceptions, packages and interfaces
<b>C222.4</b>	Students are able to write the programs using multithreading
<b>C222.5</b>	Students are able to write the programs using applets and event handling
<b>C222.6</b>	Students able to write the programs using AWT components

**Academic Year: 2017-18 II SEM      SUBJECT : Software Engineering (C221)**

**CLASS : II CSE**

<b>C221.1</b>	Student is able to practice appropriate process models for given application
<b>C221.2</b>	Student is able to write SRS for given application
<b>C221.3</b>	Student is able to Design architecture and various designs for given application
<b>C221.4</b>	Student is able to writing coding techniques and test cases for given application
<b>C221.5</b>	Student is able to explain about quality metrics of software systems
<b>C221.6</b>	Student is able to explain about estimation and maintenance of software systems

**SUBJECT : Advanced Data Structures (C223)      Academic Year: 2017-18 II SEM**

**CLASS : II CSE**

<b>C223.1</b>	Students are able to explain external sorting.
<b>C223.2</b>	Students are able to implement hashing function
<b>C223.3</b>	Students are able to implement heaps
<b>C223.4</b>	Students are able to implement Red –Black tree

<b>C223.5</b>	Students are able to implement balanced search trees
<b>C223.6</b>	Student is able to explain about Tries.

**Academic Year: 2017-18 II SEM      SUBJECT      : Computer Organization (C224)**

**CLASS                      : II CSE**

<b>C224.1</b>	Student is able to explain the basic structure of computer system.
<b>C224.2</b>	Student is able to write about machine instructions and addressing modes
<b>C224.3</b>	Student is able to explain various types of instructions.
<b>C224.4</b>	Student is able to describe IO Organization
<b>C224.5</b>	Student is able to explain memory system and secondary storage
<b>C224.6</b>	Student is able to explain about processing unit and micro programmed control

**Academic Year: 2017-18 II SEM      SUBJECT      : Formal Languages and Automata Theory (C225)**

**CLASS                      : II CSE**

<b>C225.1</b>	Students can design DFA And NFA for a given regular language
<b>C225.2</b>	Student is able to solve problems on regular expressions
<b>C225.3</b>	Students can minimize a given CFG
<b>C225.4</b>	Students can design PDA for a given CFG
<b>C225.5</b>	Student is able to explain Turing Machine concept
<b>C225.6</b>	Student is able to explain about decidable and undecidable languages

**Academic Year: 2017-18 II SEM      SUBJECT      : Principles of Programming Languages (C226)**

**CLASS                      : II CSE**

<b>C226.1</b>	Student is able to explain the concepts, syntax and semantics of programming languages
<b>C226.2</b>	Student is able to explain about data types, basic statements of programming languages.
<b>C226.3</b>	Student is able to write about the design and implementation concepts of subprograms.
<b>C226.4</b>	Student is able to explain about object oriented programming concepts.
<b>C226.5</b>	Student is able to write about functional programming languages and how to program in ML and Prolog and Scheme.
<b>C226.6</b>	Student is able to explain about logic programming languages and how to adopt new programming languages.

<b>Code</b>	<b>III Year – I SEMESTER</b>
C311	Compiler Design
C312	Data Communications
C313	Principles of Programming Languages
C314	Database Management Systems
C315	Operating Systems
C316	OS & Linux Lab
C317	Database Management Systems Lab
C318	

**Course Name: COMPILER DESIGN (C311)**

**Year of Study: 2017-18**

<b>C311.1</b>	Students are able to design lexical analyzer by using lex tool for a given simple language
<b>C311.2</b>	Students are able to design parser by using yacc tool for a given grammar
<b>C311.3</b>	Students are able to solve problems on type-checking and intermediate code generation
<b>C311.4</b>	Students are able to apply to apply data structure concepts to symbol table design
<b>C311.5</b>	Students are able to generate assembly code for a RISC machine
<b>C311.6</b>	Students are able to apply different code optimization techniques

**Course Name: DATA COMMUNICATIONS (C312)**

**Year of Study: 2017-18**

<b>C312.1</b>	Able to know about protocol stack.
<b>C312.2</b>	Students are able to write about transmission media and optical communication
<b>C312.3</b>	Students are able to explain about multiplexing and modulation techniques
<b>C312.4</b>	Students are able to explain about Microwaves and their ranges
<b>C312.5</b>	Students are able to write about Generations of telephones and their internal structures
<b>C312.6</b>	Students are able to explain about Modems and applications

**Course Name: Principles of Programming Languages (C313)**

**Year of Study: 2017-18**

<b>C313.1</b>	Students are able to write the basic concepts, syntax and semantics of programming languages.
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<b>C313.2</b>	Students are able to write the data types, basic statements of programming languages.
<b>C313.3</b>	Students are able to write the design and implementation concepts of subprograms.
<b>C313.4</b>	Students are able to write the object oriented programming concepts.
<b>C313.5</b>	Students are able to write the functional programming languages and how to program in ML and Prolog and Scheme.
<b>C313.6</b>	Students are able to explain about logic programming languages and how to adopt new programming languages.

**Course Name: Database Management Systems (C314)**

**Year of Study: 2017-18**

<b>C314.1</b>	Students are able to write the database, difference between file system vs DBMS, identify the various data models, and understand database structure.
<b>C314.2</b>	To understand Relational Model and Identify structured Query language statements used in creation an manipulation of database
<b>C314.3</b>	Able to write the methodology of conceptual modeling through ER Model, Constraints. DDL Commands, DML Commands, and Queries
<b>C314.4</b>	To able to write the Functional Dependencies, and Normal Forms.
<b>C314.5</b>	To understand properties of Transaction Management, Recovery Management and identify the various functions of DBA
<b>C314.6</b>	Identifies the file organization methods, Access Methods to store the data.

**Course Name: Operating Systems (C315)**

**Year of Study: 2017-18**

<b>C315.1</b>	Able to write the Operating Systems functions and Operating systems structures.
<b>C315.2</b>	Apply Various Scheduling Algorithms for solving process scheduling problems
<b>C315.3</b>	Solve the classical problems of Process synchronization Problems in OS
<b>C315.4</b>	Comprehend the paging concept for allocation of frames and Page Replacement algorithms
<b>C315.5</b>	Develop and Provide solutions to the problems which include dead locks in OS
<b>C315.6</b>	Apply Disc Scheduling algorithms to reduce the total Seek time of any Request in Mass storage structure.

<b>Code</b>	<b>III Year – II SEMESTER</b>
C321	Computer Networks
C322	Data Warehousing and Data Mining
C323	Design and Analysis of Algorithms
C324	Software Engineering



<b>C323.1</b>	Student is able to explain the usage of asymptotic notations and calculate the time & space complexities for various types of algorithms and estimate the performance of algorithm
<b>C323.2</b>	Student is able to describe the divide-and-conquer strategy and explain when an algorithmic design situation calls for it
<b>C323.3</b>	Student is able to explain about algorithms design using greedy method paradigm and recite algorithms that employ this paradigm.
<b>C323.4</b>	Apply designing method for development of algorithms to realistic problems such as dynamic programming strategy
<b>C323.5</b>	Implement to solve by using backtracking design strategy.
<b>C323.6</b>	Student is able to solve the problems in branch and bound strategy and recite it.

**Academic Year: 2017-18 II SEM      SUBJECT            : Software Engineering (C324)**

**CLASS                            : III CSE**

<b>C324.1</b>	Student is able to explain the basic Software engineering and practices, and their appropriate applications
<b>C324.2</b>	Student is able to explain the concept of software process models, role of project management, software requirements and the SRS
<b>C324.3</b>	Student is able to explain the different software architectural styles, implementation issues such as modularity and coding standards, verification and validation
<b>C324.4</b>	Student is able to explain the software testing approaches like unit testing, integration testing, like version management, quality control and how to ensure good quality software
<b>C324.5</b>	Student is able to explain the software evolutions like version management, quality control and how to ensure good quality software
<b>C324.6</b>	Student is able to explain some ethical and professional issues that are important for software engineers

<b>C325.1</b>	Student is able to write programs on java script and use for dynamic web pages
<b>C325.2</b>	Student will be able to write XML for creating web pages
<b>C325.3</b>	Student will be able to create client side script using AJAX and integrate with PHP
<b>C325.4</b>	Student is able to write programs on perl and ruby and interface with CGI
<b>C325.5</b>	Student is able to write programs on ruby and apply for practical web Applications
<b>C325.6</b>	Student will be able to design dynamic web pages using all the above.

<b>Code</b>	<b>IV Year – I SEMESTER</b>
C411	Cryptography and Network Security
C412	UML and Design Patters
C413	Mobile Computing
C414	Software Testing Methodologies
C415	Hadoop and Big Data
C415	Hadoop and Big Data Lab
C416	Mobile Application Development Lab
C417	Software Testing Lab
C418	Big Data Lab

**Course Name: Cryptography and Network Security (C411)**

**Year of Study: 2017-18**

C411.1	Students are able to explain various software security problems and the techniques that could be used to protect the software from security threats.
C411.2	Students are able to explain and develop various symmetric key cryptography algorithms.

C411.3	Students are able to explain number theory and apply it in asymmetric key cryptography algorithms.
C411.4	Students are able to explain hash functions and digital signature concepts applied to achieve data authentication and integrity.
C411.5	Students are able to explain transport layer security and E-mail security.
C411.6	Students are able to explain concept of IP security at network layer and Intrusion Detection System.

**Course Name: UML and Design Patters (C412)**

**Year of Study: 2017-18**

Course Code/COs	Students will be able to
C412.1	apply graphical language for software development
C412.2	Apply object oriented concept to SW Design
C412.3	Draw UML diagrams to represent Problem Domain
C412.4	Draw software life cycle
C412.5	Apply UML in software Projects for design part.
C412.6	Apply the knowledge of Design Pattern in UML

**Course Name: Mobile Computing (C413)**

**Year of Study: 2017-18**

<b>C413.1</b>	Students are able to explain concept of mobile computing, GSM architecture.
<b>C413.2</b>	Students are able to explain concept of medium access control layer, various multiplexing techniques.
<b>C413.3</b>	Students are able to explain IP and Mobile network layers, Handover, location management.
<b>C413.4</b>	Students will be able to explain data base issues and data delivery models.
<b>C413.5</b>	Students will be able to explain Mobile Adhoc Networks and related concepts.
<b>C413.6</b>	To able to explain WAP and its architecture, its protocols.

**Course Name: Software Testing Methodologies (C414)**

**Year of Study: 2017-18**

C414.1	have an ability to apply software testing knowledge and engineering methods
C414.2	have an ability to design and conduct a software test process for a software testing project
C414.3	have an ability to identify the needs of software test automation and define and develop a test tool to support test automation
C414.4	have an ability understand and identify various software testing problems and solve these problems by designing and selecting software test models criteria ,strategies and methods
C414.5	Have an ability to use various communication methods and skills to communicate with their team mates to conduct the practice oriented software testing project.
C414.6	Have an ability to use software testing methods and modern software testing tools for their testing projects.

**Course Name: Hadoop and Big Data (C415)**

**Year of Study: 2017-18**

<b>C415.1</b>	Students are able to write and implement various data structures in java programming
<b>C415.2</b>	Students are able to explain architecture of big data and hadoop.
<b>C415.3</b>	Students are able to write hadoop API for map reducing framework.
<b>C415.4</b>	Students will learn and write the concept of map reduce programming.
<b>C415.5</b>	Students are able to explain pig architecture and programming with pig latin scripting.
<b>C415.6</b>	Students are able to explain HIVE architecture and creating and managing databases, tables in HIVE data manipulations.

Code	IV Year – II SEMESTER
C421	Human Computer Interaction
C422	Cloud Computing
C423	Distributed Systems
C424	Management Science
C425	Project

**Academic Year: 2017-18 II SEM SUBJECT : Human Computer Interaction (C421)**

**CLASS : IV CSE**

Student is able to

<b>C421.1</b>	Explain the human components functions regarding interaction with computer
<b>C421.2</b>	Explain the human components functions regarding interaction with computer
<b>C421.3</b>	Demonstrate Understanding of Interaction between the human and computer components.
<b>C421.4</b>	Use Paradigms, Implement Interaction design basics
<b>C421.5</b>	Use HCI in the software process
<b>C421.6</b>	Apply Design rules
<b>C321.6</b>	Analyze Various Clustering Algorithms

**Academic Year: 2017-18 II SEM SUBJECT : Cloud Computing (C422)**

**CLASS : IV CSE**

Student is able to

<b>C422.1</b>	Demonstrate knowledge on services, architecture and virtualization.
<b>C422.2</b>	Analyze the various issues in Cloud computing.
<b>C422.3</b>	Apply API development skills in web applications for Cloud deployment.
<b>C422.4</b>	Use research based knowledge to build Cloud applications.
<b>C422.5</b>	Use advanced programming language to access Cloud services.
<b>C422.6</b>	Build Cloud environment suitable for societal requirements.

**Academic Year: 2017-18 II SEM SUBJECT : Distributed Systems (C423)**

**CLASS : IV CSE**

<b>C423.1</b>	Student is able to explain the concept of distributed systems and system models
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<b>C423.2</b>	Student is able to explain the concept of interposes communication using TCP and UDP
<b>C423.3</b>	Student is able to explain the concept distributed objects and remote invocations.
<b>C423.4</b>	Student is able to explain the concept of operating system support to distributed systems.
<b>C423.5</b>	Student is able to explain the concept of distributed file system, distributed mutual exclusion.
<b>C423.6</b>	Student is able to explain the concept of transaction management and replications.

**Academic Year: 2017-18 II SEM                      SUBJECT                      : Management Science (C424)**

**CLASS                      : IV CSE**

Student is able to

<b>C424.1</b>	learn about fundamental principles of management science
<b>C424.2</b>	estimate the dynamics of operation management
<b>C424.3</b>	learn about functional management of <b>HRM, HRD</b> and <b>PMIR</b>
<b>C424.4</b>	draw the development of <b>PERT</b> and <b>CPM</b>
<b>C424.5</b>	learn about the elements of corporate planning and vision mission goals
<b>C424.6</b>	Learn the contemporary management practices in modern business world

<b>Code</b>	<b>I Year – I SEMESTER</b>
C111	English-I
C112	Linear Algebra & Calculus
C113	Semiconductor Physics & Devices
C114	Basic Electrical & Electronics Engineering
C115	Programming for Problem Solving 1
C116	Workshop & Manufacturing Practices

**Course Name:                      ENGLISH-1 (C111)**

**Year of Study: 2018-19**

Student is able to

C111.1	Summarize how Gandhi grew in introspection.
C111.2	Explain the conditions to achieve a higher quality of life, strength and sovereignty of a developed nation.
C111.3	Identify the scientific attitude to solve many problems which we find difficult to tackle.
C111.4	To think clearly and logically and write clearly and logically.
C111.5	Identify that all men can come together and avert the peril. Demonstrate writing and basic concepts of grammar skills.

C111.6

Interpret humorous texts and use of words for irony, Rephrase coherent writing in political, social and religious background

**Course Name: Linear Algebra & Calculus (C112)****Year of Study: 2018-19**

Student is able to

C112.1	Find rank of the given matrix and is able to find the solution of given system of linear equations.
C112.2	Finds eigen values, eigen vectors and is able to understand their applications.
C112.3	Understand methods of solving differential equations of first order and first degree and is able to apply on physical applications.
C112.4	Understand methods of solving higher order differential equations and is able to apply on physical applications.
C112.5	Understand vector differentiation Gradient- Divergence- Curl and their physical Problems
C112.6	Apply Green's, Gauss, Stokes Theorem To Calculate Line Surface and Volume integral

**Course Name: Semiconductor Physics & Devices (C113)****Year of Study: 2018-19**

Students are able to

C113.1	To understand the basic concepts of Quantum Theory
C113.2	To apply the knowledge of Quantum mechanics to solids
C113.3	Aims to equip to understand the concepts of Semiconductor through crystal structures
C113.4	Realize the principles of carrier concentration in semiconductors.
C113.5	Summarize the basic theories of semiconductors to junction theory
C113.6	To comprehend the basic concepts of semiconductor physics and apply the same to electronic devices.

**Year of Study: 2018-19 Course Name: Basic Electrical & Electronics Engineering (C114)**

C114.1	Able to analyze the various electrical networks.
C114.2	Able to understand the operation of DC generators, 3-point starter and DC machine testing by Swinburne's Test.
C114.3	Able to analyze the performance of single-phase transformer
C114.4	Able to explain the operation of 3-phase alternator and 3-phase induction motors
C114.5	Able to analyze the operation of half wave, full wave bridge rectifiers and OP-AMPS.
C114.6	Able to explain the single stage CE amplifier and concept of feedback amplifier

**Course Name: Programming for Problem Solving-1 (C115) Year of Study: 2018-19**

C115.1	To formulate simple algorithms for arithmetic and logical problems and Translate the algorithms to programs (in C language)
C115.2	To test and execute the programs and correct syntax and logical errors
C115.3	To implement conditional branching, iteration and recursion
C115.4	To decompose a problem into functions and synthesize a complete program using divide and conquer approach
C115.5	To use arrays, pointers and structures to formulate algorithms and programs
C115.6	To apply programming to solve matrix addition and multiplication problems and searching and sorting problems

**Year of Study: 2018-19 Course Name: Workshop & Manufacturing Practices (C116)**

Students are able to

C116.1	Understand basic hardware and software tools through practical exposure
C116.2	Identify the various tools required to do the jobs in the fitting trade

C116.3	Make wiring connections using different house wiring elements and study the electronic elements
C116.4	Choose various machining methods and machines for metal removal
C116.5	Perform various joining methods like welding , soldering and Brazing.
C116.6	Identify the black smithy and tin smithy tools used in practice and their uses in doing different jobs.

Code	II Year – I SEMESTER
C211	Statistics with R Programming
C212	Mathematical Foundations of Computer Science
C213	Digital Logic Design
C214	Python Programming
C215	Data Structures through C++
C216	Computer Graphics
C217	Python Programming Lab
C218	Data Structures Lab

**Course Name: Statistics with R Programming (C211)**

**Year of Study: 2018-19**

<b>C211.1</b>	Able to write application of R programming for Statistical Analysis
<b>C211.2</b>	Able to explain about data structures of R programming
<b>C211.3</b>	Able to write the R functions to perform mathematical operations
<b>C211.4</b>	Able to write the R functions to perform Graphical presentation operations
<b>C211.5</b>	To write the R functions to perform Statistical operations
<b>C211.6</b>	To write the R functions to perform Regression operations

**Course Name: Mathematical Foundations of Computer Science (C212)Year of Study: 2018-1**

C212.1	Students will be able to explain concept of discrete mathematics, mathematical logic, truth tables, well formed formula, normal forms and tautology.
C212.2	Students will be able to explain set theory, relations and Hasse diagrams.
C212.3	Students will be able to write algebraic structures and number theory.
C212.4	Students will be able to explain concept of permutations and combinations.
C212.5	Students will be able to write concept of recurrence relations.

C212.6	Students will be able to explain graph theory.
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**Course Name: Digital Logic Design (C213)**

**Year of Study: 2018-19**

C213.1	Students are able to explain how the information is stored in digital system
C213.2	Students are able to design Boolean expression by using Boolean Algebra
C213.3	Students are able to write the map method to simplify Boolean expression
C213.4	Students are able to explain the procedure for designing combinational logic circuits
C213.5	Students are able to explain the procedure for designing clocked sequential circuits
C213.6	Students are able to explain components of sequential circuits

**Course Name: PYTHON PROGRAMMING (C214)**

**Year of Study: 2018-19**

<b>C214.1</b>	Describe the need of basics of python programming
<b>C214.2</b>	Students are able to explain the operators and apply decision and repetition structures in python
<b>C214.3</b>	Demonstrate the use of python lists, tuples and data structures
<b>C214.4</b>	Implement functions and modules, packages to improve readability of program
<b>C214.5</b>	Describe and apply object oriented programming methodology and concepts
<b>C214.6</b>	Demonstrate the GUI, turtle graphics and illustrate test cases in python.

**Course Name: Data Structures through C++ (C215)**

**Year of Study: 2018-19**

<b>C215.1</b>	Students are Able to identify the Appropriate Data Structure for the given problem
<b>C215.2</b>	Student will be able to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures
<b>C215.3</b>	Students will be to write linear and non-linear data structures like stacks, queues, linked list etc.,
<b>C215.4</b>	Students are able to identify shortest path in the graphs using various algorithms.
<b>C215.5</b>	Students are able to apply different pattern matching algorithms for searching the required string in the text.
<b>C215.6</b>	Students will be applying advanced data structures strategies for exploring complex

data structures.

**Course Name: COMPUTER GRAPHICS (C216)**

**Year of Study: 2018-19**

<b>C216.1</b>	Identify software and hardware components of graphics system
<b>C216.2</b>	Able to explain basics of OpenGL and able to write OpenGL programs
<b>C216.3</b>	Able to implement graphics programs with input interaction using mouse and keyboard
<b>C216.4</b>	Able to explain concept of geometrical transformations, coordinate system and frames used in graphic system
<b>C216.5</b>	Understand rendering, lighting and shading techniques
<b>C216.6</b>	Design and implement graphics application using OpenGL

<b>Code</b>	<b>III Year – I SEMESTER</b>
C311	Compiler Design
C312	Unix Programming
C313	Object Oriented Analysis and Design using UML
C314	Database Management Systems
C315	Operating Systems
C316	Unified Modeling Lab
C317	OS & Linux Lab
C318	Database Management Systems Lab

**Course Name: COMPILER DESIGN (C311)**

**Year of Study: 2018-19**

<b>C311.1</b>	Students are able to design lexical analyzer by using lex tool for a given simple language
<b>C311.2</b>	Students are able to design parser by using yacc tool for a given grammar
<b>C311.3</b>	Students are able to identify similarities and differences among parsing techniques
<b>C311.4</b>	Students are able to solve problems on type checking and intermediate code generation
<b>C311.5</b>	Students are able to generate assembly code for a RISC machine

<b>C311.6</b>	Students are able to apply different code optimization techniques
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**Course Name: Unix Programming (C312)**

**Year of Study: 2018-19**

<b>C312.1</b>	List and define basic Unix commands
<b>C312.2</b>	Explain various file permissions
<b>C312.3</b>	Differentiate and write shell script programs
<b>C312.4</b>	Analyze programs using editors and compare awk, sed
<b>C312.5</b>	Design Unix program using shell script
<b>C312.6</b>	Differentiate parent and child process and foreground/ background process

**Year of Study: 2018-19 Course Name: Object Oriented Analysis and Design using UML (C313)**

<b>C313.1</b>	Ability to find solutions to the complex problems using Object oriented approach
<b>C313.2</b>	Represent classes, responsibilities and states using UML Notation and Identify Classes and Objects responsibilities of the problem domain
<b>C313.3</b>	Be familiar with the basic modeling of UML notations and Architectures
<b>C313.4</b>	Design the sequence and collaboration diagrams for Interaction and Activity diagram for real world applications
<b>C313.5</b>	Design the different events and signal, process and threads for state chart diagram
<b>C313.6</b>	Apply component and deployment diagram for based on requirements and take the case studies and model it in different views with respect user requirements such as use case , component and deployment

**Course Name: Database Management Systems (C314)**

**Year of Study: 2018-19**

<b>C314.1</b>	Students are able to write the database, difference between file system vs DBMS, identify the various data models, and understand database structure.
<b>C314.2</b>	To understand Relational Model and Identify structured Query language statements used in creation an manipulation of database
<b>C314.3</b>	Able to write the methodology of conceptual modeling through ER Model, Constraints. DDL Commands, DML Commands, and Queries
<b>C314.4</b>	To able to write the Functional Dependencies, and Normal Forms.
<b>C314.5</b>	To understand properties of Transaction Management, Recovery Management and identify the various functions of DBA

<b>C314.6</b>	Identifies the file organization methods, Access Methods to store the data.
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**Course Name: Operating Systems (C315)**

**Year of Study: 2018-19**

<b>C315.1</b>	Able to write the Operating Systems functions and Operating systems structures.
<b>C315.2</b>	Apply Various Scheduling Algorithms for solving process scheduling problems
<b>C315.3</b>	Comprehend the paging concept for allocation of frames and Page Replacement algorithms
<b>C315.4</b>	Develop and Provide solutions to the problems which include dead locks in OS
<b>C315.5</b>	Design and Implement a prototype file systems.
<b>C315.6</b>	Perform administrative tasks on Linux Servers

<b>Code</b>	<b>IV Year – I SEMESTER</b>
C411	Cryptography and Network Security
C412	UML and Design Patters
C413	Mobile Computing
C414	Software Testing Methodologies
C415	Hadoop and Big Data
C416	Mobile Application Development Lab
C417	Software Testing Lab
C418	Big Data Lab

**Course Name: Cryptography and Network Security (C411)**

**Year of Study: 2018-19**

<b>C411.1</b>	Students are able to explain various software security problems and the techniques that could be used to protect the software from security threats.
<b>C411.2</b>	Students are able to explain and develop various symmetric key cryptography algorithms.
<b>C411.3</b>	Students are able to explain number theory and apply it in asymmetric key cryptography algorithms.
<b>C411.4</b>	Students are able to explain hash functions and digital signature concepts applied to achieve data authentication and integrity.

C411.5	Students are able to explain transport layer security and E-mail security.
C411.6	Students are able to explain concept of IP security at network layer and Intrusion Detection System.

**Course Name: UML and Design Patters (C412)**

**Year of Study: 2018-19**

Course Code/COs	Students will be able to
C412.1	apply graphical language for software development
C412.2	Apply object oriented concept to SW Design
C412.3	Draw UML diagrams to represent Problem Domain
C412.4	Draw software life cycle
C412.5	Apply UML in software Projects for design part.
C412.6	Apply the knowledge of Design Pattern in UML

**Course Name: Mobile Computing (C413)**

**Year of Study: 2018-19**

<b>C413.1</b>	Students are able to explain concept of mobile computing, GSM architecture.
<b>C413.2</b>	Students are able to explain concept of medium access control layer, various multiplexing techniques.
<b>C413.3</b>	Students are able to explain IP and Mobile network layers, Handover, location management.
<b>C413.4</b>	Students will be able to explain data base issues and data delivery models.
<b>C413.5</b>	Students will be able to explain Mobile Adhoc Networks and related concepts.
<b>C413.6</b>	To able to explain WAP and its architecture, its protocols.

C414.1	have an ability to apply software testing knowledge and engineering methods
C414.2	have an ability to design and conduct a software test process for a software testing project
C414.3	have an ability to identify the needs of software test automation and define and develop a test tool to support test automation
C414.4	have an ability understand and identify various software testing problems and solve these problems by designing and selecting software test models criteria ,strategies and methods
C414.5	Have an ability to use various communication methods and skills to communicate with their team mates to conduct the practice oriented software testing project.
C414.6	Have an ability to use software testing methods and modern software testing tools for their testing projects.

<b>C415.1</b>	Students are able to write and implement various data structures in java programming
<b>C415.2</b>	Students are able to explain architecture of big data and hadoop.
<b>C415.3</b>	Students are able to write hadoop API for map reducing framework.
<b>C415.4</b>	Students will learn and write the concept of map reduce programming.
<b>C415.5</b>	Students are able to explain pig architecture and programming with pig latin scripting.
<b>C415.6</b>	Students are able to explain HIVE architecture and creating and managing databases, tables in HIVE data manipulations.