

Department of Computer Science

Course Outcomes B.Sc. Computer Science (Optional)

B.Sc. FY Semester-I

Course	Outcomes
OCS-101 <b>Paper-I</b> Programming Logic Concepts	1. Student will be able to design algorithms to solve different problems 2. Student will understand how to solve problems using computers
OCS-102 <b>Paper-II</b> Designing of Web pages Using HTML	1. Student will be able to use the HTML programming language 2. Student will Understand the principles of creating an effective web page.

B.Sc. FY Semester-II

Course	Outcomes
OCS-103 <b>Paper-III</b> Introduction to Data Structure	1. To develop application using data structures. 2. Students develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching etc.
OCS-104	1. Course is designed to

<p><b>Paper-IV</b> Programming in C Language</p>	<p>provide complete knowledge of C language to develop logics which will help them to create programs, applications in C. 2. Introduces the more advanced features of the C language.</p>
<p>OCS-105 <b>Paper-V</b> Practical Based on OCS-102 &amp; OCS-104</p>	<p>1. Practical approach to understand the principles of creating an effective web page. 2. The course is designed to provide complete knowledge of C language to develop logics which will help them to create programs</p>

**B.Sc. SY Semester- III**

Course	Outcomes
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<p>CCCS-III Section-A <b>Theory Paper No.VI</b> Operating System</p>	<ol style="list-style-type: none"><li>1. Analyze the structure of OS and basic architectural components involved in OS design</li><li>2. Analyze and design the applications to run in parallel either using process or thread models of different OS</li><li>3. Analyze the various device and resource management techniques for timesharing and distributed systems</li></ol>
<p>CCCS-III Section-B <b>Theory Paper No.VII</b> Programming in C++</p>	<ol style="list-style-type: none"><li>1. To Remember the key concepts of OOPs and the basic structure of C++ like input, output operations.</li><li>2. To Gain the knowledge of Classes and objects</li><li>3. To Understand Constructing the functions using OOPs concepts.</li></ol>

	<ol style="list-style-type: none"> <li>4. Learn to understand inheritance and polymorphism Concept for implementing reusability in code.</li> <li>5. Understanding the basic concept of OOP &amp; differentiating the traditional structured programming approach.</li> </ol>
<p>CCCSP-II Section-A <b>Paper No. X</b> Laboratory Course Work (LCW)-II: Practical's based on theory papers-VI &amp; VII (OS and C++)</p>	<ol style="list-style-type: none"> <li>1. Learn to write programs in C++ to perform various operations using decisions and loop Statements</li> <li>2. Apply &amp; implement Major object-oriented concept inheritance, Polymorphism in C++ program</li> <li>3. Learn to develop the programs using Objects, Classes, Constructors &amp; destructors.</li> <li>4. Understand top-down</li> </ol>

	<p>and bottom-up programming approach and apply these approaches to solve real world problems.</p> <p>5. interfacing with operating System</p> <p>6. Understand different Linux commands and shell programs.</p>
<p>SECCS-I  <b>Paper No. XI</b>  Skill Enhancement Course-I:  B) PC Installation &amp; Networking</p>	<p>1. To understand the internal components of PC.</p> <p>2. Students will able to install Operating system.</p> <p>3. Students will able to establish the local Arear network.</p>

**B.Sc. SY Semester- IV**

Course	Outcomes
<p>CCCS-IV  Section-A  <b>Theory Paper No. VIII</b>  Computer Network</p>	<p>1. Describe the functions of each layer in OSI and TCP/IP model.</p> <p>2. Explain the functions of Application layer and Presentation layer paradigms and Protocols.</p>

	<p>3.Explain the types of transmission media with real time applications</p>
<p>CCCS-IV Section-B <b>Theory Paper No. IX</b> Programming in JAVA</p>	<ol style="list-style-type: none"> <li>1.To learn the structure and model of the Java Programming language.</li> <li>2.To understand about basic Java language syntax and semantics to write Java programs.</li> <li>3.Acquire conceptual knowledge of Inheritance, Packages, and Interfaces in java programming.</li> <li>4.4. Developing the knowledge &amp; skills to create reusable applications.</li> </ol>
<p>CCCSP-III Section-B <b>Paper No.XII</b> Laboratory Course Work (LCW)-III: Practical's based on theory papers-VIII &amp; IX (CN &amp; Java)</p>	<ol style="list-style-type: none"> <li>1.Learn to develop Standalone applications in java to solve simple problems.</li> <li>2.Learn to write Menu driven programs using java programming constructs.</li> <li>3.Design and implement</li> </ol>

	<p>Graphical User Interface by creating applets.</p> <p>4. Students will familiar with different networking components.</p> <p>5. Student will able to setup network withing laboratory.</p> <p>6. Student will able to configure the IP addresses.</p>
<p>SECCS-II  <b>Paper No. XIII</b>  Skill Enhancement Course-II:  A) Web Applications</p>	<p>1. Acquire knowledge about functionalities of World Wide web, Internet and websites.</p> <p>2. Learn to Create &amp; Design effective Web site using readymade templates of Google Sites platform.</p> <p>3. Learn to add gadgets of Google (Calendar, Google drive, Google map) on website.</p> <p>4. Be able to manage and publish the website for</p>

	<p>public</p> <p>5. Develop skills in analyzing the usability of website.</p>
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**B.Sc. III Semester-V**

Course	Outcomes
<p>Section-A</p> <p>DECC</p> <p><b>Theory Paper No.XII</b></p> <p>Software Engineering</p>	<p>1. To develop software engineering skills and testing plans.</p> <p>2. To understand system concepts and its application in Software development</p> <p>3. Learn various methods of software development.</p> <p>4. Apply various software testing techniques.</p>
<p>Section-B</p> <p>DECC</p> <p>( Elective)</p> <p><b>Theory Paper No. XIII[A]</b></p> <p>Visual Programming</p>	<p>1.Enable the students to Understand &amp;Learn the Visual Basic syntax, program structure, properties, modules, collections, and even application with the event-driven programming model</p> <p>2. To get adequate knowledge of design – view, code –view, class diagram view, XML data &amp;event-driven model and its interaction with the multitasking applications</p> <p>3. To enable students with IDE with visual GUI &amp; create a complete software.</p> <p>4. Design and implement applications using</p>

	any object-based methodology programming.
<p>Section-A  CCCSP  <b>Paper No. XVI</b>  Laboratory Course Work-IV:  Practical based on theory papers-XII &amp; XIII</p>	<ol style="list-style-type: none"> <li>1. To develop software engineering skills and testing plans.</li> <li>2. To understand system concepts and its application in Software development</li> <li>3. Learn various methods of software development.</li> <li>4. Apply various software testing techniques.</li> <li>5. Students develop working model of object-based programming model</li> <li>6. Student able to design &amp; create user-enable GUI</li> </ol>
<p>Section-A  SECCS-III  Skill Enhancement Course-III:  Data Mining  OR  Multimedia and Applications</p>	<ol style="list-style-type: none"> <li>1. To know the fundamentals of Multimedia.</li> <li>2. Understand the components needed in Multimedia.</li> <li>3. To acquire the skills to develop the basic multimedia operations.</li> </ol>

B.Sc. III Semester-VI

Course	Outcomes
<p>Section-A DECC <b>Theory Paper-XIV</b> Relational Database Management Systems &amp; PL/SQL</p>	<ol style="list-style-type: none"><li>1. To understand the features of Relational database.</li><li>2. To describe data models and schemas in DBMS.</li><li>3. To use SQL- the standard language of relational databases for database operations.</li><li>4. To understand the functional dependencies and design of the databases.</li></ol>
<p>Section-B DECC ( Elective) <b>Theory Paper No. XV[B]</b> E-Commerce</p>	<ol style="list-style-type: none"><li>1. Students get exposure to the Internet &amp; how E-Commerce is done over it</li><li>2. To enhance with the working knowledge of different protocol &amp; varies VAN private Networks &amp; even different types of E-commerce working model.</li><li>3. To get information of internet implementation,</li></ol>

	<p>EDI standards, EAN, article numbering system, Bar-cording of any item.</p> <p>4.To understanding complete working knowledge of e-commerce.</p>
<p>Section-B CCCSP Paper No. XVII Laboratory Course Work-V: Project Work</p>	<p>1.Student will develop small software</p> <p>2.Student will be able to find and complete the goals &amp; objective for the said project.</p> <p>3.Students able to present developed software.</p> <p>4. Student can do software testing as well.</p>
<p>Section-B SECCS-IV Skill Enhancement Course-IV: Office Automation Tools</p>	<p>1. To Recognize when to use the Microsoft Office programs for creating professional and academic documents.</p> <p>2. To Create and design a word document for general office use.</p> <p>3. To Enable the Students to have a working knowledge of paragraph formatting, macro and mail merge &amp; MS-Word-formatting</p> <p>4. Students get adequate knowledge of Excel sheets, Presentation techniques</p> <p>5. To Enhance the students with adequate knowledge of complete package of MS-Office Tool</p>

**Department of Computer Science**

**Course Outcomes M.Sc. Computer Science**

**Program Outcomes**

PO1: Apply knowledge of mathematics, science and algorithm in solving Computer problems.

PO2: Generate solutions by understanding underlying computer science environment

PO3: Design component, or processes to meet the needs within realistic constraints.

PO4: Identify, formulate, and solve problems using computational temperaments.

PO5: Comprehend professional and ethical responsibility in computing profession.

PO6: Express effective communication skills.

PO7: Recognize the need for interdisciplinary, and an ability to engage in life-long learning.

PO8: Actual hands on technology to understand it's working.

PO9: Knowledge of contemporary issues and emerging developments in computing profession.

PO10: Utilize the techniques, skills and modern tools, for actual development process

PO11: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings in actual development work

PO12: Research insights and conduct research in computing environment.

**Course Outcomes  
MSc (CS) Semester-I**

Course	Outcomes
Core CS-101 Computer Architecture and Microprocessor	1. Students will acquire skill of Assembly Language programming using 8086 Microprocessor. 2. Student will be familiar with Internal Processing of Computers

<p>Core CS-102          OOP concepts using C++</p>	<ol style="list-style-type: none"> <li>1. Students will have the conceptual knowledge of Object Oriented programming.</li> <li>2. This course will create foundation for student to learn other Object Oriented Programming Languages such as JAVA.</li> </ol>
<p>Core CS-103          Mathematical Foundation for          Computer Science</p>	<ol style="list-style-type: none"> <li>1. At the end of the course student will be able to Understand the notion of mathematical thinking, mathematical proofs and to apply them in problem solving.</li> <li>2. Ability to understand use of functions, graphs and their use in programming applications.</li> <li>3. Apply discrete structures into computing problems, formal specification, artificial intelligence, cryptography, Data Analysis.</li> </ol>
<p>Elective CS-104 A          Relational Database          Management System</p>	<ol style="list-style-type: none"> <li>1. To study the basic concepts of relational databases</li> </ol>

	<ol style="list-style-type: none"><li>2. Learn and practice data modelling using the entity-relationship and developing database designs.</li><li>3. Understand the use of Structured Query Language (SQL) and learn SQL syntax for writing queries.</li><li>4. Apply normalization techniques to normalize the databases.</li></ol>
Elective CS-104 B Computer Network	<ol style="list-style-type: none"><li>1. Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies;</li><li>2. Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols;</li><li>3. Analyze, specify and design the topological and routing strategies for an IP based networking infrastructure</li><li>4. Have a working knowledge of datagram and</li></ol>

	internet socket programming
CS-105 Lab -1 : C++ Programming	<ol style="list-style-type: none"> <li>1. Confidence in C++.</li> <li>2. Students will be skilled to learn fundamentals of advanced internet programming languages</li> </ol>
CS-106 Lab-2: ALP using 8086 Microprocessor	<ol style="list-style-type: none"> <li>1. Lab work will skill to apply the fundamentals of assembly level programming of microprocessors.</li> <li>2. Students will be skilled to learn fundamentals of designing embedded systems</li> </ol>
CS-107 (A) University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School	
CS-107 (B) Introduction to E-commerce	<ol style="list-style-type: none"> <li>1. Student get acquaint to different types of E-commerce</li> <li>2. Ability to understand use of Different EDI format for</li> </ol>

	<p>different companies.</p> <p>3. Students get knowledge of the processing of transaction over E-commerce.</p> <p>4. Student get the complete knowledge of working organization behind the internet.</p> <p>5. Recognize the fundamental principles of e-commerce</p>
<p><i>Skill based Activity</i>  <b>CS-108</b>  <b>SK-01</b>  <b>PC Assembly and Maintenance</b></p>	<p>1. Practically understand the PC and surrounding peripherals.</p> <p>2. The student will assemble / setup and upgrade personal computer systems; install OS and other application software, diagnose and isolate faulty components; optimize system performance and install / connect peripherals.</p>

**Course Outcomes**  
**MSc (CS) Semester-II**

<b>Course</b>	<b>Outcomes</b>
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<p>Core CS-201 Design and Analysis of Algorithms</p>	<ol style="list-style-type: none"> <li>1. This course will aware the implementation of various advance algorithms to solve real world problem</li> <li>2. Students will be skilled to select appropriate design techniques to solve various problems.</li> </ol>
<p>Core CS-202 Software Engineering</p>	<ol style="list-style-type: none"> <li>1. To develop software engineering skills and testing plans.</li> <li>2. To understand system concepts and its application in Software development</li> <li>3. Learn various methods of software development.</li> <li>4. Apply various software testing techniques.</li> </ol>
<p>Core CS-203 Programming with VB.NET</p>	<ol style="list-style-type: none"> <li>1. Students will able to develop simple as well as complex applications using .Net framework</li> <li>2. Students will learn to use web applications for creating GUI based programs.</li> </ol>
<p>Elective CS-204 (A) Advanced Operating System</p>	<ol style="list-style-type: none"> <li>1. Students will be able to Analyze the structure of OS and basic architectural</li> </ol>

	<p>components involved in OS design</p> <p>2. Students will be able to Conceptualize the components involved in designing a contemporary OS</p>
<p>Elective CS-204(B) Compiler Designing</p>	<p>1. To realize the students basics of compiler design and apply for real time applications.</p> <p>2. Students will get knowledge about compiler generation tools and techniques</p>
<p>CS-205 Lab-3: VB.NET Programming</p>	<p>1.To develop simple as well as complex application using .NET framework.</p> <p>2.Learn to create Microsoft windows application for creating GUI based programs.</p> <p>3.Design programs with event-based GUI interfaces using various tools and controls of IDE.</p> <p>4.To create applications using menus, toolbars,</p>

	<p>dialog boxes and directories.</p> <p>5. Able to develop projects to adapt the real time environment.</p>
<p>CS-206 Lab-4: Based on Elective Subjects</p>	<ol style="list-style-type: none"> <li>1. Understand the major phases of compilation and get the knowledge of compilation tools.</li> <li>2. Construct the intermediate code representation and generation.</li> <li>1. 3. Apply for various optimization techniques for data flow analysis.</li> <li>2. 4. To learn working of compiler and non-compiler applications.</li> <li>3. 5. To know about compiler generation tools and techniques.</li> </ol>
<p>CS-207 (A) University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental</p>	

<p>OR Intra / Inter School OR</p>	
<p>CS-207(B) Information Technology</p>	<p>After completion of this course student will be able to:</p> <ol style="list-style-type: none"> <li>1. Understand basic concepts in IT and their use in actual working.</li> <li>2. Be able to use and apply current technical concepts &amp; practices in the core information technologies.</li> </ol>
<p>Skill based Activity CS-208 SK-02 1Networking Essentials</p>	<ol style="list-style-type: none"> <li>1. Networking Essentials deals with knowing what is a network, how to install, configure, and troubleshoot a computer network. It includes knowledge of the fundamental building blocks that form a modern network, such as various cables, switches, routers, connectors, LAN-NIC cards and network operating systems.</li> <li>2. It then provides in-depth coverage of the most</li> </ol>

	<p>important concepts in contemporary networking like connecting computers/ peripherals, servers and clients, Wi-Fi connectivity, etc.</p> <p>3. Students are expected to have the skills to build a network / LAN from scratch and maintain, upgrade, and troubleshoot an existing network.</p>
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**Course Outcomes**  
**MSc (CS) Semester-III**

Course	Outcomes
CS-301 Advance Database Administration	<ol style="list-style-type: none"> <li>1. Describe database management system internals, Understand and describe architecture of database.</li> <li>2. Identify and be able to use recent and advance database techniques (e.g. in</li> </ol>

	<p>concurrency control, buffer management, and recovery)</p> <ol style="list-style-type: none"> <li>3. Decide on configuration issues related to database operation and performance. Identify which parameters are tunable and what are the implications.</li> <li>4. Analyze and optimize transactional code, identifying causes of possible anomalies and correct them.</li> </ol>
<p>Cs-302 Java Server Pages, Servlets &amp; Struts</p>	<ol style="list-style-type: none"> <li>1. Learn Web development process and various server-side technologies.</li> <li>2. Learn to Deploy Servlets on server &amp; working of Servlet Lifecycle.</li> <li>3. Understand the JSP technology, its features and advantages.</li> <li>4. Learn to access database through Java programs, using Java Data Base</li> </ol>

	<p>Connectivity (JDBC)</p> <p>5. Understand Struts MVC framework, which gives the opportunity to reuse the codes for quick development.</p>
<p>CS-303 Data Mining and Data Warehousing</p>	<ol style="list-style-type: none"> <li>1. Store voluminous data for online processing</li> <li>2. Preprocess the data for mining applications</li> <li>3. Apply the association rules for mining the data</li> <li>4. Design and deploy appropriate classification techniques</li> <li>5. Cluster the high dimensional data for better organization of the data</li> <li>6. Discover the knowledge imbibed in the high dimensional system</li> </ol>
<p>CS-304 Digital Image Processing Using MATLAB</p>	<ol style="list-style-type: none"> <li>1. To Expose the students the concepts of principals of the Digital Image Processing terminology</li> <li>2. To get adequate understanding of the</li> </ol>

	<p>mathematical foundations for digital manipulation of images, image acquisition; pre-processing; segmentation; Fourier domain processing, compression and analysis.</p> <p>3. To enhance students to write programs using MATLAB language for digital image processing.</p> <p>4. To give exposure of Learn and understand the Image Enhancement in the Spatial Domain.</p> <p>5. Learn and understand the Image Enhancement in the Frequency Domain.</p> <p>6. Understand the Image Restoration, Compression, Segmentation, Recognition, Representation and Description.</p>
<p>CS-305 Elective-III 3. Research Methodology</p>	<p>1.Enable the students to Understand research problem formulation</p> <p>2. Study various approaches of investigation of solutions for research</p>

	<p>problems</p> <ol style="list-style-type: none"> <li>3. Learn effective literature survey approaches</li> <li>4. Learn ethical practices to be followed in research</li> <li>5. Apply research methodology in case studies</li> <li>6. Acquire skills required for presentation of research outcomes (report and technical paper writing, presentation etc.)</li> </ol>
<p>CS-306 Computer laboratory 1 (Adv Database Admin + D.I.P)</p>	<ol style="list-style-type: none"> <li>1. To create database in oracle manually and using DBCA</li> <li>2. Creating and using various objects in database.</li> <li>3. Maintaining the Database, Able to backup and recovery of database.</li> </ol>
<p>CS-307 Computer laboratory 2 (JSP &amp; Servlet + DM &amp; DW)</p>	<ol style="list-style-type: none"> <li>1. Able to create dynamic and interactive web sites and interaction with client and server.</li> <li>2. Develop JSP applications using JSP Tags, JSP Scriptlets and JavaBeans.</li> </ol>

	<p>3.To Gain confidence to design dynamic web pages on java platform using server based technology.</p> <p>4.To Create applications implementing Session Management and Database Connectivity.</p> <p>5.Able to understand how to handle large and complex web application.</p> <p>6. Evolve Multidimensional Intelligent model from typical system</p> <p>7.Evaluate various mining techniques on complex data objects</p>
<p>CS-308 Seminar</p>	<p>1.To Enable students with presentation skills</p> <p>2.To Enhance students - way of presentation with suitable tools &amp; body postulate and language.</p> <p>3. Provide a showcase of presentation techniques.</p>

**Course Outcomes  
MSc (CS) Semester-IV**

Course	Outcomes
CS-401	Students on completion on

<p>Fuzzy System and ANN</p>	<p>this course should be able to</p> <ol style="list-style-type: none"> <li>1. Students have adequate knowledge of Fuzzy application with various technical tool and ANN real time application</li> <li>2. To Expose the students to the concepts of feed forward, RBF, Delta, pattern recognition using neural networks.</li> <li>3. To get the brief concept of fuzziness involved in various systems and to provide adequate knowledge about fuzzy set theory.</li> <li>5. To provide adequate knowledge of application of artificial neural network-control to real time systems.</li> </ol>
<p>CS-402 Linux Administration</p>	<ol style="list-style-type: none"> <li>1. Evaluate and apply technology resources (Program Learning Outcome); - by installing, configuring, and managing a Linux</li> </ol>

	<p>server and relevant services and applications;</p> <p>2. understand the importance of maintaining a secure Linux server; and,</p> <p>3. communicate using multiple modes of communication</p>
<p>CS-403 Elective :</p> <ol style="list-style-type: none"> <li>1. Embedded system Design through C &amp; C++</li> <li>2. Artificial Intelligence</li> <li>3. Introduction to Bioinformatics</li> </ol>	<ol style="list-style-type: none"> <li>1. Understanding of Microcontroller based system.</li> <li>2. Demonstrate the open source Real time operating System.</li> <li>3. Study of architecture of 8051 Microcontroller.</li> </ol>
<p>CS-404 Cloud Computing</p>	<ol style="list-style-type: none"> <li>1. Study of Cloud Infrastructure.</li> <li>2. Able to understand importance of virtualization along with their technologies.</li> <li>3. Use and examine different cloud computing services like SaaS, PaaS, IaaS.</li> <li>4. Understand Cloud</li> </ol>

<p>CS-405 Project</p>	<p>backup and solutions.</p> <ol style="list-style-type: none"> <li>1. Student will be able to understand and decide the goals for real time project.</li> <li>2. Acquire the skill of team work</li> <li>3. Apply the software development phases to decided project.</li> <li>4. Gain industry experer in software engineering practices.</li> </ol>
<p>CS-406 Computer Laboratory 3 ( FS&amp;ANN) +Linux</p>	<ol style="list-style-type: none"> <li>1. To install the various versions of Linux OS</li> <li>2. Configure the Linus system.</li> <li>3. Establish the X window system.</li> <li>4. Install various essential files (drivers and programs)</li> <li>5. Establish the network</li> </ol>
<p>CS-407 Computer Laboratory 4 (Elective)</p>	<ol style="list-style-type: none"> <li>1. Become familiar with programming environment used to develop embedded system.</li> </ol>

	<p>2. Understand key concepts of embedded system like I/O, timers, interrupts, interaction with peripheral devices.</p>
<p>CS-408 Open Elective Cyber Crime &amp; Cyber Security</p>	<p>1. Explore the legal, ethical, and global impact of cybercrime on private, public, and personal computing infrastructures</p> <p>2. Demonstrate an Understanding of cyber security to overcome the cyber crime</p> <p>3. Develop an understanding of the legal issues associated with cyber security</p> <p>4. Understand the core concepts, tools, and methods used to secure computer systems.</p>