- **Department of Computer Science**
- **Course Outcomes:**
- **F Y B Sc.**

CS 111: Basics of Computer	• Understand the History of Computers. • Understand What Computer and Basic concepts of computer are. • Aware about various types of Computers, types of input and output devices. • Preparation of Algorithm and Flowchart of Program. • Learn computer networks, its types and basics of Internet. • Understand computer viruses and its types.
CS 112: C Programming - I	• Develop their programming skills. • Be familiar with programming environment with C Program structure. • Declaration of variables and constants. • Understand operators, expressions and preprocessors. • Understand arrays, its declaration and uses.
CS 121: Internet Computing	• Understand the Types of Website, it's Structure, Site Organization Model , Site Planning and Testing. • Understand how to design website with different website development models. • Know the different page types on websites and it's navigations. • Designing website using HTML language. • Design advanced website using CSS.
CS 122: C Programming - II	• Design programs using Functions, Pointers, Structures and Unions in C language. • Write a program using File Handling. • Writing programs for drawing different graphical shapes.
CS 103 and 203: Lab course on Paper I & II	• On completion of the course, students are able to develop programs using C to meet real world needs and able to develop their own websites. • This course provides platform to enhance students basic skills required for advance programming.

- **S Y B Sc.**

COMP 211 : Data Structure I	Students will be able to • Know what is data structure and basic algorithmic notations. • Analyze the time and space requirement of any algorithm. • Understand different linear data structures for conversion of mathematical expressions and polynomial representations. • Know the file structures.
COMP 212 : OOAD & Introduction to C++	• Be familiar with Object Oriented Programming Environment. • Differentiate between Structure oriented programming and object oriented programming. • Understand different object modeling techniques and analysis like Generalization, Aggregation and Metadata. • Write Reusable, Extensible and Robust programs in C++.
COMP 221 : Data Structure II	• Know different non-linear data structures that can be used to represent hierarchical relationship between objects. • Traverse and represent the graphs in computer. • Understand the different approaches of sorting and searching elements in the arrays. • Understand different techniques of designing the algorithms.
COMP 222 : Programming in C++	• Explore polymorphism using Function and Operator Overloading. • \Write programs for handling runtime errors using exception.

	• Understand the concepts of pointers in C++. • Understand the different aspects of hierarchy of classes and their extensibility. • Write generic programs using templates and STL.
COMP 213 and 223 : Practical Course	Students should understand, • On completion of the course, students are able to develop programs using C++ based on object oriented concepts and write the ROBUST, EXTENSIBLE and EFFICIENT
• **T Y B Sc.**	
CS-311: System Programming	• Get aware about system software's and their tools like Editors and Debug Monitors. • Get familiar with language processing activities. • Understand detail working of Assembler, Macro and Macro Preprocessor, Compiler and linker & Loader.
CS-312: Database Management System	• Get aware of Describing & storing data. • Know about E-R Model by overview of database design. • Get familiar with Conversion of ER to Relational model. • Know about functional dependency and Data Normalization. • Understand Database Implementations. • Make use of Concurrency control, Backup & recovery for large or huge of databases. • Get aware about handling huge databases.
CS-313: Software Engineering	• Get aware of evaluation of software and Software Development Life Cycle (SDLC). • Know about Software Development Model. • Get knowledge of Requirement Analysis and Specification in software engineering. • Learn use of Fact finding Techniques, Types of Requirement Modeling and Data Modeling Concepts. • Get knowledge of Design Concepts in software engineering. • Know about Cohesion & Coupling , Decision Table & Decision Tree, Data flow Diagram • Know about Software Coding & Testing. • Get aware about elements of software quality assurance.
CS-314: Computer Aided Graphics	• Differentiate between interactive and non interactive graphics. • Explore different line and circle drawing algorithms. • Perform 2D and 3D transformation on different images. • Know about detail working of image clipping and windowing. • Understand raster graphics and hidden surface elimination.
CS-315 Programming in VB.NET	• Get aware about .Net platform. • Understand looping structure, control flow statements and exception handling in VB.NET • Understand object oriented programming in VB.NET • Create applications that use ADO NET.
Elective-A CS-316 A): Programming in C#	• By using c# code and ASP.Net create dynamic web pages. • Using MS Visual Studio.NET IDE and Create Console Applications. • Know about Basic Principal of OOP, Defining Class and using functions.

	• Able to use constructor and destructor. • Use Polymorphism ,Method Overriding ,Method hiding
Elective -B UG-CS 316 B): JAVA Programming-I	Students should understand, • Get knowledge JDK Environment. • Explore polymorphism using Function and Operator Overloading , overriding . • Understand the different aspects of hierarchy of classes and their extensibility. • Understand the concepts of streams and files . • Write programs for handling runtime errors using exception.
CS-321: Operating System	• Know about functions and services of operating system. • Aware about different CPU scheduling algorithms • Get familiar with different memory management techniques. • Understand different disk and drum scheduling algorithms as well as deadlock concepts. • Get introductory knowledge about android operating system.
CS-322: MS SQL Server	• Understand features and data types in SQL server. • Create and manipulate databases for various applications. • Use procedures and trigger for performing complex operation on databases. • Handle errors using exception handling concepts.
CS-323: Internet Programming using PHP	• Understand how PHP works with lexical structure of it. • Program for different applications using arrays, functions and strings. • Aware about different web techniques used in PHP. • Integrate PHP with MYSQL.
CS-324: Theoretical Computer Science	• Understand what is Push down Automata and its applications. • Understand concepts of Context free grammar and normalization of CFG. • Convert regular expression to Finite Automata. • Design Turing Machines for various applications like enumerator, function computer and universal Turing machine.
CS-325: Computer Network	• Understand applications of network, network structures and protocol hierarchy • Aware about details of physical, data link, network and transport layer of TCP/IP network model. • Understand about different aspects of network security like firewalls, IP security and VPNs. • Aware about attacks and Confidentiality used in cryptography.
Elective - A CS-326 A): Web Programming using ASP.NET	• Using features of ASP.Net create ASP.Net Compilation Model, Code • Behind Model Execution Stages. • Know about ASP. NET Controls , ASP.Net Intrinsic Objects • Use page layout, styles and text balance, site map, Master pages and content Pages, Navigation controls: Tree view, site map path (bread crumb), Menu navigation. • By using ASP.Net create dynamic web pages
Elective - B CS-326 B): JAVA	• Program using graphical user interface with Swing classes. • Handle different kinds of events generated while handling windows.

Programming-II	• Create programs using menus and dialog boxes. • Program for websites using applets. • Understand advanced java concepts like JDBC and servlets.
CS-Lab-301: Lab on System Programming	Students should understand, • On completion of the course, students are able to develop system programs to provide basic • Applications for computing like editor, interrupt handler, SMACO and lexical analyzer.
CS-Lab-302: Lab on Programming in VB.NET, Computer Aided Graphics	• On completion of the course , students are able to develop different programs for demonstrating different Computer graphics algorithms like circle , line drawing and clipping and filling as well as students can create dynamic web pages using VB.NET.
CS-Lab-304: Lab on MS SQL Server	• On completion of the course, students are able to develop database management system using features and services provided by MS SQL Server.
CS-Lab-305: Lab on Internet Programming using PHP	• On completion of the course, students are able to develop interactive static as well as dynamic websites.
Elective -A CS-Lab-303 A): Lab on Programming in C#	• On completion of the course, students are able to develop programs using C# based on object oriented concepts and write the ROBUST, EXTENSIBLE and EFFICIENT programs by using c# code and ASP.Net create dynamic web pages.
Elective -B CS-Lab-303 B): Lab on JAVA Programming –I	• On completion of the course, students are able to develop efficient programs which provides graphical user interface for easy handling of computers using JAVA.
M. Sc. I	
CS-101: Advanced C++ Programming	• Understand advanced concepts for handling runtime errors using stack unwinding, uncaught exception and automatic cleanup. • Study the Runtime Type Information of the member variables, functions and the multiple inheritances that are used in the program. • Study advanced concepts of C++ by resolving ambiguities and duplicate sub object in virtual base classes. • Understand applications of C++ like Smart Pointer, Generic Pointer , Object Validation and Reference Counting. • Understand detail concepts of STL.
CS-102: Automata Theory and Computability	• Understand what is Push down Automata and its applications. • Design Turing Machines for various applications like emunerator, function computer and universal turing machine. • Study Post correspondence problem, decidability of membership, emptiness and equivalence problems of natural languages. • Get familiar with Computability and complexity measures. • Understand what is DNA and Membrane Computing.
CS-103: Advanced Operating System	• Study files subsystem for UNIX operating system. • Understand detail working of UNIX operating system. • Understand process and memory management techniques.
CS-104: Digital	Students should understand,

Image Processing	• Understand the application of digital image processing. • Explore knowledge about image processing fundamentals. • Get aware about image sampling and quantization and operation on images • Understand histogram processing and various image filtering algorithms. • Know about various noise models and transformation techniques. • Be aware of various morphological techniques and segmentation schemes.
CS-105- LAB – I: Lab on Advanced OS and Digital Image Processing	• Students should understand, • Get hands on various linux commands and shell script for different application. • Familiar with MATLAB environment. • Explore various algorithms for digital image processing using MATLAB.
CS -106-LAB – II: Lab on Advanced C++ Programming	• On completion of the course, students are able to develop ROBUST, EXTENSIBLE and EFFICIENT programs using advanced concepts of STL in C++.
CS-201: Advanced DBMS	• Explore ideas about centralized and client server architecture of DBMS. • Differentiate and handle parallel and distributed databases. • Realize object oriented databases and XML databases for Dynamic website development. • Be familiar with mobile and multimedia databases.
CS-202: Machine Intelligence	• Understand artificial intelligence and AI problem solving techniques. • Explore logic for solving various AI problems. • Grasp the techniques of knowledge representation in machine. • Comprehend advanced machine learning techniques such as fuzzy logic and genetic algorithms.
CS-203: Compiler Construction	Students should understand, • Know role of compilers in program execution. • Understand detail program execution using lexical and syntax analysis • Be aware of code generation and optimization.
CS-204: Design and Analysis of Algorithms	Students should understand, • Design efficient algorithms using various algorithm designing techniques. • Comprehend dynamic programming using control abstraction and longest common subsequence. • Classifying any problem as NP complete and NP hard estimate the amount of Chl-a, Chl-b and total Chlorophylls by spectrophotometermethod. •
CS-205- LAB – III: Lab on DAA and MI	• On completion of the course, students are able to build the program that can solve the problems which requires intelligence to solve them. They can build programs which can generate output in less time and execute in less space
CS -206-LAB - IV Lab	• On completion of the course, students are able to build and maintain

on Advanced DBMS	the databases handling real life applications and daily needs.
M. Sc. II	
CS-301: Software Engineering	• Know the requirements of developing software. • Be aware of various models required for software development. • Test the developed software for its functionality and performance. • Understand software quality and quality measures. • Grasp the software configuration management and project planning.
CS-302: Optimization of Algorithm	• Understanding classification and limitation of quantitative techniques. • Take hold of linear programming problem solving techniques. • Solve various kinds of transportation problems using different techniques. • Explore concepts in game theory • Be aware about the network models, sequencing models and simulaon models
CS-303: Advanced Java Programming	• Design programs using Remote method invocations (RM. • Explore programming techniques of Java beans and swing. • Be aware about Java Enterprise applications. • Know about java servlets and java struts.
CS-304: Windows, WCF and WPF Programming	Students should understand, • Familiar with windows environment and child window controls. • Understand windows communication foundation using WCF contracts, clients and services security. • Understand windows presentation foundation, WPF and .Net programming.
CS-305-LAB – V: Lab on Windows, WCF and WPF Programming	• On completion of the course, students are able to develop program having graphical user interface for various applications.
CS -306-LAB –VI: Lab on Advanced Java Programming	• On completion of the course, students will get hands on training for various java programs like JDBC, EJB, Servlets, Struts etc.
CS-401: Natural Language Processing	• Understand languages and linguistic background • Be familiar with applications and research background in NLP. • Grasp mathematical foundation related to NLP like probability, bays theorem and machine learning. • Know about linguistics essentials and grammar as part of speech and parsing and differentiating them ,And aware about word morphology and N-Gram Models.
CS-402: Advanced Network Programming	• Understand network fundamentals with TCP/IP architecture. • Aware with client server programming and its application using socket interface. • Understand IGMP ICMP and IP data grams. • Understating the mobile and advoc network programming.
CS-403: Data Warehousing and Data Mining	• Understand data warehousing for business analysis using OLAP, OLTP, MOLAP and ROLAP. • Explore the concepts of data mining and data preprocessing. • Understand concept of association rule mining.

	• Grasp classification and prediction and analyse different issues related to them. • Identify different cluster analysis techniques. • Know about advanced data mining techniques such as spatial data mining and understand the concept of big data analysis.
CS-404- LAB – VII: Lab on Network programming and Data Mining	• On completion of the course, students are able to develop client server programs for various services like TCP ,UDP, Telnet, FTP and HTTP. Students are able to analyze the processing and classification techniques using WEKA tool.
CS -405: Mini Project (200 marks)	• Deal with real world data. • Familiar about real time IT industry environment. • Expeirnance about applying the knowledge they got up till now. • Build a whole real time working system which will satisfy all customer's needs.