

- M. Sc. in COMPUTER SCIENCE
- SECOND SEMESTER (EVEN SEMESTER)

FACULTY OF SCIENCE

Eligibility Criteria (Qualifying Exams)	Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per Week			EoSE Duration (Hrs.)	
					L	T	P	Thy	P
After appearing in the first semester examination irrespective of any number of back/ arrear papers	CMP 201	CCC	OPERATING SYSTEM CONCEPTS	5	4	2	00	3	0
	CMP 211	CCC	OPERATING SYSTEM CONCEPTS – LABORATORY WORK	2	00	00	3	0	3
	CMP202	CCC	OBJECT ORIENTED PROGRAMMING CONCEPTS IN C++	5	4	2	00	3	0
	CMP 212	CCC	OBJECT ORIENTED PROGRAMMING CONCEPTS IN C++ - LABORATORY WORK	2	00	00	3	0	3
	CMP203	CCC	WEB TECHNOLOGY : BASED ON ASP.NET	5	4	2	00	3	0
	CMP 213	CCC	WEB TECHNOLOGY : BASED ON VB.NET & ASP.NET - LABORATORY WORK	2	00	00	3	0	3
	CMP 221	PRJ/FST/EST	SOCIAL OUTREACH AND SKILL DEVELOPMENT WITH MINOR PROJECT	6	00	00	9	00	4
	CMP B01	ECC/CB	COMPUTER SYSTEM ORGANIZATION AND ARCHITECTURE	6	4	3	00	3	00
	CMP B02	ECC/CB	DISCRETE MATHEMATICS						
	CMP B03	ECC/CB	COMPUTER GRAPHICS						
	MINIMUM CREDITS IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30				TOTAL=33				

M.Sc. in COMPUTER SCIENCE (SECOND SEMESTER)			
COURSE CODE:	CMP 201	COURSE TYPE :	CCC
COURSE TITLE: OPERATING SYSTEM CONCEPTS			
CREDIT: 07		HOURS: 135	
THEORY: 05	PRACTICAL: 02	THEORY: 90	PRACTICAL: 45
MARKS: 100			
THEORY: 70	CCA : 30	PRACTICAL: 33	
OBJECTIVE: The main objective is to give the basic concepts regarding operating systems . How it works , it's types and various process synchronization and communication , memory management , file and secondary storage management..			
UNIT-1 15 Hrs	Introduction: OS As An Extended Machine, OS As An Resource Manager, Design Goals, Types and Functions of Operating System. Operating system Services, Mainframe OS, Server OS, Multiprocessor OS, Personal Computer OS, Real Time OS, Embedded OS, Smart Card OS, Processor, Buses, Processes, Deadlocks, Memory Management, I/O, Files, Security, The Shell, System Calls, OS Structure.		
UNIT-2 15 Hrs	Process Management: Process states & Process Control block, Schedulers, CPU Scheduling algorithm, Process Creation, Process Termination, Process Hierarchies, Process State Implementation Of Processes, Thread Model, Thread Usage. Interprocess Communication, Communication in Client Server Systems, Multithreaded Programming, Scheduling Criteria, Algorithm Service, Synchronization, The Critical Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Monitors, Synchronization Examples, Atomic Transaction, Deadlock Characterization, Methods of handling Deadlocks, Recovery from Deadlock.		
UNIT-3 20 Hrs	Memory Management (Contiguous and non contiguous) : Address Binding, Dynamic Loading and Linking Concepts, Logical and Physical Addresses, Contiguous Allocation, Fragmentation, Paging, Segmentation, Virtual Memory, Demand Paging, Page fault, Page replacement algorithms, Global Vs Local Allocation, Thrashing,		
UNIT-4 20 Hrs	File and Secondary Storage Management: File Attributes, File Types, File Access Methods, Directory Structure, File System Organization and Mounting, Allocation Methods, Free Space management; Disk Structure, Logical and Physical View, Disk Scheduling, Formatting, Swap Space Management. Protection & Security., DOS, UNIX/ LINUX and WINDOWS as an example of Operating systems.		
UNIT- 5 20 Hrs	Protection and Security: Goals and Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Security Problem, Program Threats, Cryptography as a Security Tool, User Authentication.		

**LABORATORY WORK
CMP 211**

1. Practise any five Unix commands.
2. Practise any five Linux commands.
3. Practise any five internal Dos commands.
4. Practise any five External Dos commands.
5. Practise DESKTOP and Icons in Windows O.S.
6. Practise pop-up Menu and shortcuts in Windows O.S.
7. Practise any three socket commands of Unix O.S.
8. Practise for simple Networking using any Network O.S.

**SUGGESTED
READINGS**

1. Operating System Concepts 6/ed By Silberschatz and Galvin, Addison Wesley.
2. Operating Systems: Internals and Design Principles 5/ed By William Stalling, PHI.
3. Modern operating Systems By Tanenbaum, PHI.
4. Operating System Concepts By Peterson and Silberschatz, Addison Wesley.
5. Operating System Principles By P. B. Hansen, PHI.
6. The UNIX Operating System By K. Christian, John Wiley.

M.Sc. in COMPUTER SCIENCE (SECOND SEMESTER)	
COURSE CODE:	CMP 202 COURSE TYPE : CCC
COURSE TITLE: OBJECT ORIENTED PROGRAMMING CONCEPTS IN C++	
CREDIT: 07	HOURS: 135
THEORY: 05 PRACTICAL: 02	THEORY: 90 PRACTICAL: 45
MARKS: 100	
THEORY: 70 CCA : 30	PRACTICAL: 33
OBJECTIVE: The main objective knows the basic principles of OOPS. Basic data types, familiar about class and objects, polymorphism and Inheritance, file handling and Exception handling.	
UNIT-1 15 Hrs.	Principles of OOP Procedure oriented Vs Object oriented, OOP paradigm, Features of OOP, History of C++, Basic Data types, Tokens, Keywords, Constant, Variables, Operators, I/O statements, Structure of C++ program, Creating, Compiling and Linking the program, Arrays, Pointers, Object modeling technique (OMT).
UNIT-2 15 Hrs	Function, Object and Class Defining Class, Abstract class, Function prototype, Function with parameter, Passing object as a parameter, Constructor function, Types of constructor, Destructor, Friend function, Friend class, Dynamic allocation operator new and delete.
UNIT-3 20 Hrs	Polymorphism and Inheritance Types of polymorphism, Constructor overloading, Operator overloading, Template function Template class, Types of inheritance, Private, protected and public derivation of class, Resolving ambiguity Pointer to object, This pointer, Virtual class, virtual function.
UNIT-4 20 Hrs	Input - output and File handling I/O classes, File and stream classes, Opening and closing file, Detecting end of file, String I/O, Char I/O, Object I/O, I/O with multiple object, File pointer, Disk I/O.
UNIT- 5 20 Hrs	Exception handling, Name spaces and Standard Template library (STL) Exceptions Basics, Standard Exceptions, Need of Exception handling, Exception handling mechanism, try, catch and throws keywords, defining namespace, benefit of namespace, Component of STL.
LABORATORY WORK CMP 212	<ol style="list-style-type: none"> 1. Design a program to create a class and object. 2. Design a program for various relational operators. 3. Design a program for scope resolution operator. 4. Design a program for private and public member functions. 5. Design a program for passing object as parameter. 6. Design a program constructor and Destructor. 7. Design a program for operator overloading. 8. Design a program function overloading. 9. Design a program for various types of inheritance. 10. Design a program for template. 11. Design a program for virtual class and function. 12. Design a program for file handling and Exception handling.

**SUGGESTED
READINGS**

1. Object oriented programming with C++ by E.BalagurusamyIInd edition Tata Mc-Graw Hill.
2. Object Oriented Programming By McGregor and Sykes S A, 1992 Van Nostrand.
3. The C++ Programming Language By Strustrup B, Addison-Wesley.
4. Object Oriented Programming in C++ By Lafore R, Galgotia Publications.
5. Introduction to Object Oriented Programming By Witt KV, Galgotia Publications.
6. Object Oriented Programming By Blaschek G, Springer Verlag

M.Sc. in COMPUTER SCIENCE (SECOND SEMESTER)	
COURSE CODE: CMP 203	COURSE TYPE : CCC
COURSE TITLE: WEB TECHNOLOGY : BASED ON ASP.NET	
CREDIT: 07	HOURS: 135
THEORY: 05 PRACTICAL: 02	THEORY: 90 PRACTICAL: 45
MARKS: 100	
THEORY: 70	CCA : 30
	PRACTICAL: 34
OBJECTIVE: The main objective is to develop a website by using ASP.Net. To know the basics of Database connectivity using ASP.Net .	
UNIT-1 15 Hrs.	Overview of the ASP.NET: Introduction of different Web Technology, What is Asp.Net, How Asp.Net Works, Use of visual studio, Different Languages used in Asp.Net., Framework, Common Language Runtime (CLR), .NET Framework Class Library. Installing Internet Information Server, Installation of Asp.Net, virtual directory, Application Setting in IIS.
UNIT-2 15 Hrs	Coding Standards Overview of coding standards follows during programming, Displaying information-Label Controls, Literal Controls, Bulleted List, Accepting User Input. TextBox controls- RadioButton and RadioButtonList Controls. CheckBox and CheckBoxList Controls, Button controls, LinkButton Control, ImageButton Control ,Using Hyperlink Control, DropDownList, ListBox, Displaying Images, Image Control, Image Map Control, Using Panel Control, Using Hyperlink Control, Asp.Net Validation Controls-Required Field Validator Control, Regular Expression Validator Control, Compare Field Validator Control, Range Validator Control, Validation Summary Control, Custom Validator Control
UNIT-3 20 Hrs	Master Pages and Advanced Control Creating master pages, Creating default contents, Nesting master pages, Registering master pages in web configuration, Accepting File Uploads, Saving files to file system, Calendar Control, Displaying advertisements, Displaying Different Page view, Displaying a Tabbed Page View, Wizard Control
UNIT-4 20 Hrs	SQL Server Basic Microsoft SQL Server 2008, Overview of SQL Server 2008, Installation of SQL Server 2008, Features of SQL Server Express, SQL Server 2008 Express management tools, Database Architecture, Data Manipulation Language (DML), Data Definition Language (DDL), Manipulation of Data (SQL Command), Stored Procedure, Function
UNIT-5 20 Hrs	Overview of Data Access Creating database connections, Connecting to MSSQL Server and MS Access, DataSet&DataTable Features, Using inline SQL Statements, Using Stored Procedures, Executing select commands, Sql Transaction, Grid View Control fundamentals, Displaying Data, Using Data Keys, Sorting Data, Paging through Data, Using the Details View control, Displaying data with the DetailsView control, Using Fields with the DetailsView control, Displaying Empty data with the DetailsView control, Displaying data with the Repeater Control, Displaying Data with the Data List Control, Deploying application on Web Server

**LABORATORY WORK
CMP 213**

1. Design a program for various controls of tool box in window application .
2. Design a program for addition of five numbers in single dimension .
3. Design a program for various types of arrays .
4. Design a program for various relational operators .
5. Design a program for developing a Website in ASP.Net .
6. Design a program for functions .
7. Design a program for subroutine .
8. Design a program for login form and database connectivity using ASP.Net .
9. Design a program to develop any website .
10. Design a program for report generation .
11. Design a program for searching any field from database using ASP.Net.
12. Design a program to develop any Online software using ASP.Net .

**SUGGESTED
READINGS**

1. The complete Reference By Thomos A. Powell ,TMH publication
2. Web Technology :A Developers Perspective ,N.P.Gopalan ,J.Akilandeswani,PHI Publication.
3. Java Script :The definite Guide By Flangam , O'Reilly
4. Java Script :Developers Resource by Kamran Husain and Jason Levitt PTR-PHI publication.
5. "Mastering VB Script" BPB Publication.
6. World Wide Web design with HTML by Xavier Tata McGraw Hill Publication .
7. XML By Example, Sean McGrathPentice Hall Publication.
8. Web Technology : A Developments Perspective , N.P. Gopalan, J. Akilandeswari, PHI Publication.

**M.Sc. in COMPUTER SCIENCE
(SECOND SEMESTER)**

COURSE CODE: CMP221 COURSE TYPE: PRJ/FST/EST

COURSE TITLE: SOCIAL OUTREACH AND SKILL DEVELOPMENT WITH MINOR PROJECT

CREDIT: 06

HOURS : 90

MARKS : 100

OBJECTIVE: To visit any field/organization/company where computer applications are used for their daily transactions or working so that the students are familiar of that and get knowledge for software development.

**Guidelines for
social outreach**

Students should develop their Minor projects in following format :

- 1) Data collection from field/organization/company.
- 2) Analysis of collected data.
- 3) Designing front end and back end according to the need of the field/organization/company.
- 4) Coding
- 5) Testing
- 6) Implementation Reports
- 7) Minor project Submission

Project Evaluation Guidelines.

The project is evaluated on the basis of following heads :

Power point Presentation - 25% of total marks.

Internal Viva - 20% of total marks.

Thesis/Project report - 30% of total marks.

Software Coding

Documentation - 10% of total marks.

Software Execution - 15% of total marks.

M.Sc. in COMPUTER SCIENCE (SECOND SEMESTER)	
COURSE CODE: CMP B01COURSE TYPE : ECC/CB	
COURSE TITLE: COMPUTER SYSTEM ORGANIZATION AND ARCHITECTURE	
CREDIT: 06	HOURS : 90
THEORY: 06	THEORY: 90
MARKS : 100	
THEORY: 70	CCA : 30
OBJECTIVE: The main objective is to know about the organization of a computer . To gain knowledge about micro operations , pipeline and vector processing, memory organization .	
UNIT-1 20Hrs.	Micro operation and Computer Organization : Arithmetic micro operation, Logic micro operation, Shift micro operation, Arithmetic logic shift unit, Instruction codes, Computer registers, Computer instructions, Instruction cycle, I/O and interrupt, Design of basic computer and Accumulator logic.
UNIT-2 20Hrs	Programming Basic Computer and C.P.U Organization: Machine language, Assembly language, Assembler, Compiler, Programming arithmetic and logic operation, I/O programming, General register organization of C.P.U, Stack organization, Instruction format, Addressing modes .
UNIT-3 20 H rs	Pipeline and Vector Processing: Parallel processing, Pipelining, Arithmetic pipelining, Instruction pipeline, RISC pipeline, Vector processing, Memory interleaving, Array processor, Multiprocessor.
UNIT4 15 Hrs	Input-output Organization: Peripheral devices, I/O interfaces, Modes of data transfer, Asynchronous data transfer, DMA, Priority interrupt, I/O processor.
UNIT-5 15 Hrs	Memory Organization: Memory hierarchy ,Auxiliary memory, Microcomputer memory, , Associative memory, Virtual memory, Cache memory, Memory management hardware.
SUGGESTED READINGS	<ol style="list-style-type: none"> 1. M.Morris Manno, “Computer system Architecture”, 3rd Edition, PHI 2. Carl Hamacher, ZvonkoVranesic and SafwatZaky, 5th Edition “Computer Organization”, McGraw- Hill,2002. 3. William Stallings, “Computer Organization and Architecture – Designing for Performance”, 6th Edition, Pearson Education, 2003. 4. David A.Patterson and John L.Hennessy, “Computer Organization and Design: The hardware / software interface”, 2nd Edition, Morgan Kaufmann, 2002. 5. John P.Hayes, “Computer Architecture and Organization”, 3rd Edition, McGraw Hill, 1998. 6. B. Ram “Computer Fundamentals and Organization” 4thEdition .

M.Sc. in COMPUTER SCIENCE (SECOND SEMESTER)	
COURSE CODE: CMP B02 COURSE TYPE : ECC/CB	
COURSE TITLE: DISCRETE MATHEMATICS	
CREDIT: 06 THEORY: 06	HOURS : 90 THEORY: 90
MARKS : 100 THEORY: 70 CCA : 30	
OBJECTIVE: The main objective is to know about Mathematical Logic , Set theory, Boolean algebra ,Groups and Graphs .	
UNIT-1 20Hrs.	Mathematical Logic : Notations, Algebra of Propositions & Propositional functions, logical connectives, Truth values & Truth table Tautologies & Contradictions, Normal Forms, Predicate Calculus, Quantifiers. Set Theory: Sets, Subsets, Power sets, Complement, Union and Intersection, De-Morgan's law Cardinality,relations: Cartesian Products, relational Matrices, properties of relations equivalence relation functions:Injection, Surjection, Bijection, Composition, of Functions, Permutations, Cardinality, the characteristic functions recursive definitions, finite induction.
UNIT-2 20Hrs	Boolean Algebra : Truth values and truth tables, the algebra of propositional functions, boolean algebra of truth values ,Axiomatic definitions of Boolean algebra as algebraic structures with two operations, Switching Circuits.
UNIT-3 20 H rs	Groups : Groups, axioms, permutation groups, subgroups, co-sets, normal subgroups.
UNIT-4 15 Hrs	Graphs : Simple Graph, directed graph, Degree of a Vertex, Types of Graphs, Sub Graphs and Isomorphic Graphs, Operations of Graphs, Path, Cycles and Connectivity, Euler and Hamilton Graph, Shortest Path Problems, BFS ,DFS, Dijkstra's Algorithm, Representation of Graphs, Planar Graphs, Applications of Graph Theory.
UNIT-5 15 Hrs	Matrices : Addition, subtraction, multiplication, transposes,Adjoint,Inverse.
SUGGESTED READINGS	<ol style="list-style-type: none"> 1. A text book of Discrete Mathematics By Swapan Kumar Sarkar (S. Chand & company Ltd.). 2. Discrete Mathematical structure with Applications to computer science By J.P Trembly& R.P. Manohar. 3. Discrete Mathematics By K.A Ross and C.R.B writht. 4. Discrete Mathematics Structures By Bernard Kohman& Robert C. Bushy. for computer science 5. Discrete Mathematics By Seymour Lipschutz Mare Lipson. Tata McGraw-Hill Edition.

M.Sc. in COMPUTER SCIENCE (SECOND SEMESTER)	
COURSE CODE: CMP B03 COURSE TYPE : ECC/CB	
COURSE TITLE: COMPUTER GRAPHICS	
CREDIT: 06 THEORY: 06	HOURS : 90 THEORY: 90
MARKS : 100 THEORY: 70 CCA : 30	
OBJECTIVE: The main objective is to know about Computer graphics and Multimedia which helps students to know about Graphics primitives and Transformations . Multimedia features are very useful for students in	
UNIT-1 20Hrs.	Introduction : Introduction to computer Graphics, Pixel, frame, buffer, application of computer graphics, Raster Graphics fundamentals. Display Devices- Random Scan, Raster Scan Monitors, Color CRT Monitor, DVST and Plasma Panel.
UNIT-2 20Hrs	Graphics Primitives : Algorithms for line Generation, circle generation, Polygon generation and polygon filling algorithm, Anti aliasing . 2D Transformation : Translation, Scaling, Rotation, Reflection, homogeneous Coordinates.
UNIT-3 20 H rs	3-D Transformation : Translation, Scaling, Rotation, windowing & clipping windows, view port, line clipping, polygon clipping, windows & view port transformation. Display file, Segment table, Segment creation, deletion, rename,
UNIT-4 15 Hrs	Multimedia : Text – Font, Faces, animating Text, Hyper Text. Sound : MIDI, Digital audio basics, auto file formats, audio editing, MCI-multimedia control interface. Image - Bitmap, Vector drawing, color palate, concept of 3D Modeling, Image file formats(BMP, JPG). Animation : Principle of animation, cell animation, kinematics, morphing.
UNIT-5 15 Hrs	Video – Broadcast video standards (NTSC, PAL), Integrating computer and television, video capture board, video, colour, shooting and editing video, recording formats 9S-VHS, video hardware resolution, video compression (JPEG, MPEG). Hard copy devices: Printers & plotters, Input devices : mouse, Trackball, Light pen, Scanner, Digital Camera.
SUGGESTED READINGS	1. William M. Newman and Robert F. Sproull, “ Principles of Interactive Computer Graphics “, Tata McGraw- Hill Edition. 2. Steven Harrington “ Computer Graphics “ , 2nd Edition, Tata McGraw-Hill Edition. 3. Foley, van Dam, Feiner and Hughes, “Computer Graphics (Principles and Practice)” , Indian Edition, Addison Wesley Publication. 4. D Hearn and P M Baker ,”Computer Graphics “, Printice Hall of India (Indian Edition). 5. D F Rogers ,”Mathematical Elements for Computer Graphics “, 2nd Edition, Tata McGraw-Hill