As per model syllabus of U.G.C. New Delhi, drafted by Central Board of Studies and Approved by Higher Education and the Governor of M.P.



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## Faculty of Science

## **Syllabus & Prescribed Books**

## **Subject- Computer Science**

## **M.Sc. Semester Examination**

## 2016-17

## I & II Semester

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## **COURSEWISE SCHEME** I<sup>st</sup> SEMESTER

- 1. Course Code 2. Course Name
- : MSCCS
- : M.Sc. Computer Science
- 3. Total Theory Subject : 4
- 4. Total Theory Marks : 200

5. Total Practical :2 6. Total Practical Marks : 100 7. Total Marks : 300 8. Minimum Passing Percentage : 36

Sub						Practical		Total						
Code	Subject Name			Pape	er		ССЕ		Total Marks					
		1st	2nd	3rd	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Compulso	ory													
MSCCS 101	Discrete Mathematics Structures	42	0	0	42	15	8	3	50	18	0	0	50	18
MSCCS 102	Programming in C	42	0	0	42	15	8	3	50	18	0	0	50	18
MSCCS 103	Computer Organization & Architecture	42	0	0	42	15	8	3	50	18	0	0	50	18
MSCCS 104	Windows & P.C., Software	42	0	0	42	15	8	3	50	18	0	0	50	18
MSCCS 105	<b>Practical-I</b> (C Language)	0	0	0	0	0	0	0	0	0	50	18	50	18
MSCCS 106	Practical-II	0	0	0	0	0	0	0	0	0	50	18	50	18



#### M Sc (Computer Science) Semester I

#### Paper-I DISCRETE MATHEMATICS STRUCTURES

#### Unit-I:

Mathematical Logics: Introduction. statements and notations, connective, normal forms, the theory of inference for the statement calculus, the predicate calculus.

#### Unit-II:

Sct Theory: Basic concepts, representation of discrete structure. relation & ordering, functions, natural numbers, recursion. recursion in mechanical theorem proving.

#### Unit-III:

Algebraic Structures: Introduction, algebraic system, semi groups and monoids, grammars & languages, polish expressions and their compilation.

#### Unit-IV:

Lattices and Boolean Algebra: Introduction, lattices as partially ordered sets, boolean function, representation and minimization of boolean algebra.

#### Unit-V:

Graph Theory: Introduction, basic concepts, storage representation and manipulation of graphs, simple precedence grammars.

#### **Text Books:**

- 1. Discrete Mathematics- John Truss.
- Discrete Mathematical Structures with applications to Computer Science Tremblay & Manohar(TMH)





#### M Sc (Computer Science) Semester I

#### Paper-II

#### PROGRAMMING IN C

Unit-I:

Overview of C, Feature of C, Structure of Program, Variables, Expression. Identifiers. Keywords, Data Types, Constants, Operators: Arithmetic, Logical, Relational, Conditional and Bitwise Operators, Precedence and Associativity of Operators, Types Conversion in Expression. Unit-II:

Basic Input/Output and Library Functions Single Character Input/Output i.e. Getch(), Getchar(), Getche(), Putchar(), Formatted Input/Output i.e. Printf() and Scanf(), Library Functions- Concepts, Mathematical and Character Functions.

Control Structures- If Statement, If Else Statement, Nesting of If......Else Statement, Else If Ladder, ? : Operator. Switch Statement, Compound Statement, Loop Controls- For While, Do- While Loops, Break Continue, Exit, Goto Statement.

#### Unit-III:

The Need of a Function, User Defined and Library Function, Prototype of a Function, Function Argument, Return Values and Nesting of Function, Main(), Command Line Argument, Recursion, Calling of Functions, Array as Function Argument, Scope and Life of Variables- Local and Global Variable, Storage Class Specifier-Auto, Extern, Static, Register, Preprocessor Directive.

Unit-IV:

Arrays- Single and Multidimensional Arrays, Array Declaration and Initialization of Arrays, String: Declaration, Initialization, String Functions. Structure and Union-Defining Structure, Declaration of Structure Variable, Accessing Structure Members, Nested Structures, Array of Structures, Structure Assignment, Structure as Function Argument, Function That Return Structure, Union.

Unit-V:

Pointers- The & And \* Operators, Pointers Expressions, Pointers VIS Arrays, Pointer to Functions, Functioning Returning Pointers. Dynamic Memory Allocation: Introduction, Malloc, Calloc, Sizeof, Free, Relloc Functions, Bitwise Operator.

#### **Text Books:**

1. Let us C -- Yashwant Kanitkar

2. Schaum's Series - C Programming

3. Text your skills in C - S. Thamarai Selvi & R Murugse(TMH)

**Reference:** 

1. Programming in C – E. Balaguruswami (TMH)

2. The Complete Reference in C/C++ -- Herbert Schildt (TMH)





### M Sc (Computer Science) Semester I Paper-III COMPUTER ORGANIZATION & ARCHITECTURE

#### Unit-l:

Digital Logic Circuits: Digital Computers. Logic Gates, Boolean Algebra, Map Simplification, Combination Circuits (i.e. Half-Adder). Flip-Flops (i.e. SR FlipFlops, D Flip-Flops, JK Flip-Flops, T Flip-Flops, Edge Triggered Flip-Flops, Execution Table), Sequential Circuits.

#### Unit-II:

Data Representation: Data Type (i.e. Number System. Octal and Hexadecimal Number, Decimal Representation, and Alphanumeric Representation), Complements, Fix Point Representation. Floating-Point Representation.

#### Unit-III:

Basic Computer Organization and Design: Instruction Codes. Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instruction, Input-Output and Interrupt, Complete Computer Description Design of Basic Computer.

#### Unit-IV:

Central Processing Unit: Introduction, General Register, Organization, Stock Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control Reduced Instruction Set Computer (RISC).

#### Unit-V:

Input-Output Organization: Peripheral Devices (ASCII alphanumeric Characters), Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Access (DMA), Input-Output Processor (IOP).

#### Text Book:

- 1. Computer System Design & Architecture- Heuring Jordan(A.W.L.)
- 2. Computer System Architecture- M.Morris Mano, PH.I.



#### M Sc (Computer Science) Semester I

Paper-IV

WINDOWS & PC-SOFTWARE

Unit-I:

Introduction to MS-DOS: History and Versions of DOS, Fundamentals of DOS, Booting Process. Internal and External DOS Commands, Creating and Executing Batch Files.

Unit-II:

Introduction for Windows: Features of Windows. Hardware Requirement for Running Version of Windows. New Installation & Upgradation, Origin of Windows, Part of Windows Screen, Types and Anatomy of Windows, Using Program Manager, Creating and Using Groups, Using File Manager, Accessories.

Unit-III:

Introduction to Word Processing (MS Word) Advantages of Word Processing, Introduction & Installation Editing a File, Using Paragraph Styles Newspaper. Style Column, Using Macros. Advanced Word Processing, Header & Footer, Formatting Text Setting Up Printer Mail Merge and Other Applications Mathematical Calculations, Table Handling.

Unit-IV:

Introduction to Spread Sheet (MS Excel) Definition and Advantages of Electronic Worksheet Working on Spreadsheet, Range and Related Operations, Setting Saving and Retrieving Worksheet File, Insetting, Deleting, Copying and Moving of Data Cells, Inserting and Deleting Rows and Columns, Protecting Cells, Printing a Worksheet, Erasing a Worksheet, Graphs Creation: Types of Graphs, Creating a Chart on Chart Sheet, 3D Column Charts, Moving and Changing the Size of Chart, Printing the Chart. Unit-V:

Introduction of MS Power Point Element of Power Point, Exploring Menus of Power Point, working with Dialog Boxes Adding File Text and Art and Picture to Slide Printing Slides, View Slide, Outline, Slide Sorter Notes and Slides Show View, Slide Setup Formatting and Enlarging Text Slides with Graphs. Text Books:

1. PC Software for Windows and Made Simple by Taxali (TMH)

2. Computer Awareness and Application by Malhotra.





M.Sc. Computers Science Sem - I

#### Laboratory 'C'

- 1. Write a program to swap the contents of two variables with & without using temporary variable.
- 2. Write a program to print the Fibonacci series up to a given numbers of terms.
- 3. Write a program to invert 3 x 3 matrix.
- 4. Write a program multiply two matrices.
- 5. Write a program to create an odd magic square.
- 6. Write a program to find all capital letters in string.
- 7. Write a program to convert upper case letters to lower case & vice versa in a sentence of mixed cases,
- 8. Write a program to search a number in an array using the algorithm like sequential search etc.
- 9. Write a program to check whether a string is a palindrome or not.
- 10. Write a program to calculate factorial of a no through recursion.
- 11. Write a program to calculate roots to a quadratic equation.

:2

## **COURSEWISE SCHEME** II<sup>nd</sup> SEMESTER

- 1. Course Code 2. Course Name
- : MSCCS
- :M.Sc. Computer Science
- 3. Total Theory Subject :4
- 4. Total Theory Marks : 200

6. Total Practical Marks : 100 7. Total Marks : 300

5. Total Practical

8. Minimum Passing Percentage : 36

Sub	Theory										Practical		Total	
Sub. Code	Subject Name			Pap	er		CCE		Total Marks					
		1st	2nd	3rd	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Compuls	sory													
MSCCS 201	Data Structures and Algorithms	42	0	0	42	15	8	3	50	18	0	0	50	18
MSCCS 202	Operating System	42	0	0	42	15	8	3	50	18	0	0	50	18
MSCCS 203	Computer Networks with windows NT	42	0	0	42	15	8	3	50	18	0	0	50	18
MSCCS 204	Programming in Java	42	0	0	42	15	8	3	50	18	0	0	50	18
MSCCS 205	<b>Practical-I</b> (C Language)	0	0	0	0	0	0	0	0	0	50	18	50	18
MSCCS 206	Practical-II	0	0	0	0	0	0	0	0	0	50	18	50	18



### M. Sc. (Computer Science) Semester II

#### Paper-I DATA STRUCTURES AND ALGORITHMS

#### Unit-l:

Data Representation: Introduction. Linear List. Formula Based Representation. Linked Indirecting Addressing. Simulating Pointers. A Comparison. Applications. Convex Hull. Arrays And Matrices Arrays, Matrices, Special Matrices- Sparse Matrices.

#### Unit-II:

Stacks: The Abstract Data Type, Derived Class and Inheritance, Formula Based Representation, Linked Representation, Applications.

Queues: The Abstract Data Type, Formula Based Representation, Linked Representation, Application.

Binary and Other Trees: Trees, Binary Trees, Properties, Representation, Common Binary Tree Operation, Binary Tree Traversal, the ADT Binary Tree, The Class Binary Tree, ADT And Class Extensions, Applications.

#### Unit-III:

Priority Queues: Introduction, Linear List, Applications.

Tournament Trees: Introduction, The ADT Winner Tree, The Class Winner Tree, Loser Tree Applications.

Search Trees: Binary Search Tree, AVL Trees, Red-Black Tree, B- Tree Applications. Unit-IV:

Graphs: Definitions, Applications, Properties, The ADTs Graph and Digraph, Representation of Network, Class Definition: Graph Iterators, Language Features, Graph Search Methods, Applications.

The Greedy Method: Optimization Problem, The Greedy Method, Applications.

Divide And Conquer: The Method, Application.

Unit-V:

Dynamic Programming: The Method, Applications.

Backtracking : The Method, Applications.

Branch and Bound: The Method, Applications.

#### **Text Books:**

- 1. Weiss- Data Structures & Algorithm Analysis in C++ (A.W.L.)
- 2. Data Structures, algorithms and Applications in C++ by Sahni (Mc Graw Hill)





### Paper-II Unit-I :

### M Sc (Computer Science) Semester II OPERATING SYSTEM

Overview of the operating system: Evaluation of operating system. Classification of Operating System : Batch OS, Multiprogramming, Time Sharing, Real Time, Combination, Distributed OS .Different Views Of Operating System: Operating System as a Processor Manager, Memory manager, File Manager, Device Manager etc. System Services. System Calls. Hierarchical & Extended Machine View. Design And Implementation Of OS .Functional Requirements. Implementation.

#### Unit-II:

File management: file concept, file types. File based system, disk based system, blocking file operations, creating, writing, reading ,deleting, file access methods, file allocation methods-contiguous, dynamic, linked and indexed allocation performance of allocation methods under various size of files directory system single level two level structured, file protection mechanism layered file system.

#### Unit-III :

Processor management process views, structure, state, process, control block multiprogramming levels of schedulers and scheduling algorithms, evaluation of various scheduling algorithms, multiple processor scheduling, process synchronization, synchronization mechanism, virtual processors, Interrupt mechanism, future trends in processor management.

#### Unit-IV:

Memory management: memory management schemes, contiguous allocation, single & partitioned (static & dynamic) segmentation, non-contiguous allocation, paging, virtual memory concepts, demand paging, performing page fault, page replacement algorithms, segmentation and paging ,future trends in memory management, large main memories, storage hierarchies, hardware support of memory management.

#### Unit-V:

Technique for device management, dedicated devices, shared devices, virtual devices, sequential access, direct access devices, channel and control unit, independent devices, operation, buffering, multiple paths, block multiplexing ,device allocation consideration, i/o traffic controller, i/o scheduler, i/o device handlers, virtual devices, spooling system. Text Book:

1. Operating System: Gary Nutt



#### M Sc (Computer Science) Semester II

#### Paper-III **COMPUTER NETWORKS WITH WINDOWS NT**

#### Unit-l:

Analog & digital signal. electronic spectrum, asynchronous & synchronous transmission. Ideal channel band rate, baseband, broadband channel, multiplexer FDM. TDM, STDM, carrier modulation. AM, FM. PCM. PWM, SWM, encoding schemes, the needs and importance of networking, type of networks, server based, peer based, hybrid, layered architecture, LAN topology, network adopted card, logical topology, modem.

#### Unit-II:

Switching technique, message switching. circuit switching. packet switching. virtual circuit. transmission media. OSI reference model. IEEE standards. 802.3, 802.4, 802.5 ALOHA, SLOTTED ALLOHA, CSMA. CSMA/CD Bitmap CCITTX.25, CCITT x11, token ring, token bus.

#### Unit-III:

Fast Ethernet, FDDI token ring, wireless LAN, ATM network, principles of internetworking , internet working devices, bridge, routers ,gateways, repeater, routing algorithms, distance vector routing, shortest path routing, broadcast routing, multicast routing, ICP/IP protocol, IPV6 addressing, congestion control, traffic shaping.

#### Unit-IV:

TELNET, FTP, SMTP, MINE, SNMP, UDP, URL (Uniform Resource Locater) THTTP source routing bridge, transport bridge, ISDN channel, ISDN services, base band ISDN, broadband ISDN. Different switches, PBX network, network securing application of cryptography to security, data encryption transposition cipher, substitution cipher, PSA algorithms.

#### Unit-V:

Introduction to windows NT, various features, differences with other windows environment and other OS, windows NT workstations versus server. Kernel and its subsystems.

Security Models: system level restrictions, server application security, domain group access.



#### M Sc (Computer Science) Semester II

#### Paper-IV PROGRAMMING IN JAVA

Unit I :

History and design features of JAVA. how Java works. basics of JAVA. Application and Applets. using the tools in JDK, javadoc, Java, jdb etc.

Applets Programming - Creating and executing Java applets. inserting applets in a web page. Java security.

Unit-II:

JAVA Language- keywords. Constants ,Variables and Data types. Operators and statements: Break, continue, and return. Array. String and String Buffer Classes, Wrapper Classes.

Classes, Objects and Methods: Defining a class, adding variables and methods, creating Objects, constructors, class inheritance.

#### Unit-III:

Inheritance ,basic types, using super, multi level hierarchy, abstract and final classes, object class, packages and interfaces, packages.

Exception Handling, Fundamentals, exception types, uncaught exceptions, throws, throw, try -catch, final, built in exceptions, creating your own exceptions.

#### Unit-IV:

Multithreading Fundamentals, Java Thread model: priorities, synchronization, messaging, thread class, Runnable interface, Interthread communication, suspending, resuming and stoping threads. Input/Output- Basics - Streams, Byte and Character Streams, predefined streams, Reading and writing from console and files using standard Java Packages Java Package (lang,util, io)

Networking-Basics, networking classes and interfaces, using java.net package, doing TCP/IP and Datagram Programming.

#### Unit-V:

AWT Classes, Event Handling and swing classes, AWT Programming, Working with windows, Graphics and text, Using AWT controls, Layout managers and menus, Handling image, animation, sound and video.

Event Handling-Different mechanism, the Delegation Event Model, Event Classes, Event Listener interfaces, Adapter and Inner Classes.

Java swing applet, icons and labels, text fields, buttons, combo boxes, tabbed and scroll panes, trees, tables.

#### Text book :

Programming with Java by E. Balaguruswamy.

#### **Reference Book :**

Java - the complete reference by Patrick Naughton and Herbert Schieldt

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## Faculty of Science

## **Syllabus & Prescribed Books**

## **Subject-** Computer Science

## **M.A. Semester Examination**

## 2017-18

## III & IV Semester

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## COURSEWISE SCHEME III<sup>rd</sup> SEMESTER

1. Course Code : MSCCS

:4

- 2. Course Name :M.Sc. Computer
- 3. Total Theory Subject
- 4. Total Theory Marks : 200

- 5. Total Practical : 2
- 6. Total Practical Marks : 100
- 7. Total Marks : 300
- 8. Minimum Passing Percentage : 36

	Subject Name	Theory									Practical		To	otal
		Paper					CCE Total		tal					
Sub.									Ma	rks				
code														
		1 <sup>st</sup>	$2^{nd}$	3 <sup>rd</sup>	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Comput	sory paper						I							
MSCCS 301	RDBMS concepts and Oracle	42	0	0	42	15	8	3	50	18	0	0	50	18
MSCCS 302	Multimedia Tools and Applications	42	0	0	42	15	8	3	50	18	0	0	50	18
MSCCS 303	Software Eng.	42	0	0	42	15	8	3	50	18	0	0	50	18
MSCCS 304	Java	42	0	0	42	15	8	3	50	18	0	0	50	18
MSCCS 305	Practical (i) Java	0	0	0	0	0	0	0	0	0	50	18	50	18
MSCCS 306	Practical (ii)	0	0	0	0	0	0	0	0	0	50	18	50	18





### M. Sc. III Sem (Computer Science) Semester- III Paper-I RDBMS Concepts and Oracle

- UNIT-I Relational model: storage organizations for relations, relational algebra, relational calculus, functional dependencies, multivalued dependencies, and normalization. Relational query language. Functional Dependencies, Good & Bad Decomposition, Anomalies as a database: A consequences of bad design, Universal Relation, Normalization: 1NF, 2NF, 3NF, BCNF, 4NF 5NF. Relational Algebra, Structured query language(SQL), Using MS Access, Implementing SQL Functions, Integrity, Indexing, View Using MS Access.
- UNIT-II Degree Of Data Abstraction, The Database Life Cycle (DBLC): Initial Study Of The Database, Database Design, Implementation and Loading, Testing And Evaluation, Operation, Maintain Ace And Evaluation.
- UNIT-III Centralized Verses Decentralized Design, What Is A Transaction? Concurrency Control (Locking Methods, Time Stamping Method, Optimistic Method) DDBMS Distributed Database Management Systems) Advantage And Disadvantages. Homogeneous And Heterogeneous DBMS, Distributed Database Transparency Features. Level Of Data And Process Distribution: SPSD (Single– Site Processing, Single-Site Data), MPSD (Multiple-Site



Processing, Single Site Data), MPMD (Multiple –Site Processing, Multiple-SiteData)

- UNIT-IV Systems, Client / Server: Architecture And Implementation Issues. Client / Server Systems, What Is Client / Server? The Forces That Drive Client /Server
- UNIT-V (DSS) Decision Support Systems: Operational Data Vs. Decision
   Support Data, The DSS Database Requirements. The Data
   Warehouse: The Evaluation Of The Data Warehouse, Rules For
   Data Warehouse. Online Analytical Processing (OLAP): OLAP
   Architecture Relational, OLAP And Comparison, Data Mining.

### **TEXT AND REFERENCE BOOKS:**

- 1. An Introduction to Database Systems (Sixth Edition) By C. J. Date
- Data Base Systems (3rd Edition) Galgotia Publications (P) Ltd. By Peter Rob Carlos Coronel
- 3. An Introduction to Database Systems By Bipin C. Desai





### M. Sc. III Sem (Computer Science) Semester- III Paper-II MULTIMEDIA TOOLS AND APPLICATIONS

UNIT–I Multimedia: Needs and areas of use, Development platforms for multimedia–DOS, Windows, Linux. Identifying Multimedia elements – Text, Images, Sound, Animation and Video, Making simple multimedia with PowerPoint.

**Text** – Concepts of plain & formatted text, RTF & HTML texts, using common text preparation tools, Conversion to and from of various text formats, using standard software, Object Linking and Embedding concept, Basics of font design, overview of some fonts editing and designing tools, Understanding & using various text effects.

**Images** – importance of graphics in multimedia, Vector and Raster graphics, image capturing methods – scanner, digital camera etc. various attributes of Images – size, color, depth etc, Various Image file format – BMP, DIB, EPS, CIF, PEX, PIC, JPG, TGA, PNG and TIF format – their features and limitations, graphic file formats conversions, processing images with common software tools such as Photoshop, Paint Shop pro, Corel draw etc..

UNIT-II Sound: Sound and it Attributes, Mono V/s Stereo sound, Sound channels, Sound and its effect in multimedia, Analog V/s Digital sound, Basics of digital sounds-Sampling, Frequency, Sound Depth, Channels, Sound on PC, Sound standards on PC, Capturing and Editing sound on PC, Overview and using some sound recording, editing software. Overview of various sound file formats on PC – WAV, MP3, MP4, Ogg Vorbose etc.

Animation: Basics of animation, Principle and use of animation in multimedia, Effect of resolutions, pixel depth, Images size on quality



and storage. Overview of 2-D and 3-D animation techniques and software- animation pro, 3D studio & Paint Shop pro animator Animation on the Web – features and limitations, creating simple animations for the Web using GIF Animator and Flash.

UNIT-III Video: Basics of Video – Analog and Digital Video, How to use video on PC. Introduction to graphics accelerator cards, DirectX Introduction to AV/DV and IEEE1394 cards, Digitization of analog video to digital video, Interlacing and non-interlacing, Brief note on various video standards – NTSC, PAL, SECAM, HDTV, Introduction to video capturing Media & instrument – Videodisk, DVCAM, Camcorder, Introduction to digital video compression techniques and various file formats – AVI, MPEG, MOVE Real Video.

Brief Introduction to video editing and movie making tools – Quick time, video for windows & Adobe premier.

- **UNIT-IV** Authoring tools for CD Based Multimedia: Type of multimedia authoring tools, key factors of selecting CD based multimedia authoring tools, Planning and distribution of a multimedia project. Multimedia development team & skills requirement, Stages in designing & producing multimedia products for CD, Testing of product, distribution of multimedia product, various formats of CD's and DVD's.
- UNIT V Multimedia on the Web: Bandwidth relationship, broadband technologies, Text in the web – Dynamic and embedded font technology, Audio on the Web – Real Audio and MP3/MP4, Audio support in HTML, Graphics–HTML safe color palate, Interlaced V/s



Non interlaced model, Graphics support in HTML, Image Map, Video on the Web – Streaming video, Real Video, MPEG and SMIL, Virtual Reality on the Web.

### **TEXT AND REFERENCE BOOKS :**

- Multimedia: Making It Work (4th Edition) by Tay Vaughan, Tata Mcgraw Hills.
- 2. Multimedia In Action James E Shuman Vikas Publishing House.
- Multimedi Basics Volume 1 Technology, Andreas Holzinger, Firewall Media(Laxmi Publications Pvt. Ltd) New Delhi.





### M.Sc. Semester III Paper-III Software Engineering

- Unit-I The Software problem, Software Engineering problem, Software Engineering approach–phased development process, project management and matrices. Software processes – Processes, Projects, Components, Characteristics. Software Development process – process step specification, waterfall model, prototyping, iterative enhancement, spiral model.
- Unit-II Software Requirement Analysis and Specification–Software Requirements, Problem Analysis, Requirement Specification, Validation, Metrics.
- Unit-III Planning a Software project Cost Estimation, Project Scheduling, Staffing and personnel planning, Software Configuration management plans, Quality Assurance plans, Project Monitoring Plans, Risk Management.
- Unit-IV Software Design Design Principles, Module level concepts, Design Notation and Specification, Structured Design Methodology, Verification. Coding Programming Practice, Verification and Metrics.
- Unit- V Software Testing Testing fundamentals, Functional testing, Structural testing, Testing process.
   Software Quality Assurance (SQA): Software Reviews, Software Quality factors, SQA activities, Formal Technical Reviews, SQA Approach. Software Configuration Management Configuration Identification, Change Control, Status Accounting and Auditing.



### M.Sc. Semester III Paper - IV

### ADVANCED JAVA PROGRAMMING

- **UNIT-I JAVA BASICS REVIEW** Java streaming Networking Event handling Multithreading Byte code Interpretation Customizing application Data Structures Collection classes.
- UNIT-II DISTRIBUTED COMPUTING Custom sockets Remote Method Invocation - Activation - Object serialization -Distributed garbage collection - RMI - IIOP - Interface definition language – CORBA - JINI overview.
- UNIT-III JAVA BEANS AND SWING Bean concepts Events in bean box -Bean customization - Persistence - Application - deployment using swing - Advanced swing techniques - JAR file handling.
- UNIT-IV JAVA ENTERPRISE APPLICATIONS JNI Servlets Java Server
   Pages JDBC Session beans Entity beans Programming and
   deploying enterprise Java Beans Java transactions.
   RELATED JAVA TECHNIQUES
- **UNIT-V Graphics** Java Media Frame work 3D graphics Internationalization -Case study - Deploying n-tierapplication, E- commerce applications.

### **REFERENCES** :

- 1. Deitel & Deitel, "Java How to program", Prentice Hall, 4 th Edition, 2000.
- Gary Cornell and Cay S. Horstmann, "Core Java Vol 1 and Vol 2", Sun Microsystems Press, 1999.
- 3. Stephen Asbury, Scott R. Weiner, Wiley, "Developing Java Enterprise Applications", 1998.





## COURSEWISE SCHEME IV<sup>th</sup> SEMESTER

- 1. Course Code
- 2. Course Name :M.Sc. Computer

: MSCCS

:4

:2

: 200

- 3. Total Theory Subject
- 4. Total Theory Marks
- 5. Total Practical

- 6. Total Practical Marks : 100
- 6. Project Marks : 50
- 7. Total Marks : 350
- 8. Minimum Passing Percentage : 36

	Subject Name	Theory										tical	Total	
		Paper					CCE Total			tal				
Sub.							Marks			rks				
code														
		1 <sup>st</sup>	$2^{nd}$	3 <sup>rd</sup>	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Compute	sory paper	L							I		I		I	
MSCCS 401	UNIX INTERNALS, SHELL PROGRAMMING & LINUX	42	0	0	42	15	8	3	50	18	0	0	50	18
MSCCS 402	COMPUTER DESIGN	42	0	0	42	15	8	3	50	18	0	0	50	18
MSCCS 403	ASP.NET AND C#	42	0	0	42	15	8	3	50	18	0	0	50	18
Elective	paper (Any One)													
MSCCS 404-A	Artificial Intelligence and Expert System	42	0	0	42	15	8	3	50	18	0	0	50	18
MSCCS 404-B	Data Warehousing and Minig	42	0	0	42	15	8	3	50	18	0	0	50	18
Compute	sory													
MSCCS 405	<b>Practical (i)</b> ASP.NET	0	0	0	0	0	0	0	0	0	50	18	50	18
MSCCS 406	<b>Practical (ii)</b> SHELL PROGRAMMING (Linux/Unix)	0	0	0	0	0	0	0	0	0	50	18	50	18
MSCCS 407	Project Work	0	0	0	0	0	0	0	50	18	0	0	50	18



#### M. Sc. IV Sem(Computer Science)

### Paper-I UNIX INTERNALS, SHELL PROGRAMMING & LINUX

- Unit I Introduction to the kernel:- Architecture of the Unix, the buffer cache, Internal representation of files:- inode, accessing blocks, releasing blocks, structure of regular files, conversion of path name to an inode, inode assignment to new file, allocation of disk-block.
- **Unit II** System calls for the file systems:- OPEN, READ, WRITE, CLOSE, PIPES:the pipe system call opening a named pipes, reading and writing pipes, closing pipes, DUP,LINK, UNLINK, system call for TIME and CLOCK.
- Unit III The structure of processes:- process states and transitions. Layout of system memory, the context of a process, saving the context of the process. Manipulation of the process address space.
  Preserve Control: Preserve exercises a size the Preserve transition of the process.

Process Control:- Process creation, signals, Process termination, awaiting process termination, the user id of a process, changing the size of the process,

- Unit IV Shell Programming:- Study of different types of Shell like C Shell, Bourne Shell etc. Shell variable, Shell Script. Shell Command. Looping and Making choices:- For Loop, While and Until, passing Arguments to Scripts. Programming in different shells.
- Unit V LINUX Filesystems Hierarchy, editors, common Linux command, Mounting & Un-mounting CD- ROM, Floppy Disk, Different access permission, Backup & Restoring, Network Configuration command Ipconfig, hostname, Telnet

#### BOOK :-

- 1. The Design of Unix Operating system by Maurice Bach
- 2. Advanced Unix- A Programmer Guide by Stephen Prata.
- 3. Linux Bible by Christopher Negus





Semester- IV (Computer Science)

### **Paper-II COMPILER DESIGN**

- UNIT I Automata Introduction to Finite Automata, Structure Representation, Automata and Complexity, Alphabets, String, Language Informal Picture of Finite Automata, Deterministic Finite Automata, Nondeterministic Finite Automata, An Application.
- UNIT II Introduction To Compiler, Overview of Compilation, Process, Typical Compiler Structure, Implementing A Compiler Programming Language Grammars, Elements of A Formal Language Grammar, Derivation, Reduction & Syntax Trees, Ambiguity Regular Grammar & Regular Expression – Context Free Grammar.
- UNIT III Scanning & Parsing Techniques The Scanner, Regular Grammar and Fsa, Top Down Parsing, Parsing Algorithm, Top Down Parsing Without Backtracking, Predictive Parsers, Bottom Up Parsing, Parsing, Lr Parsers, Shift Reduce Parsing.
- UNIT IV Symbol Table Organization, Memory Allocation Static & Dynamic Memory Allocation, Compilation Control Transfer, Procedure Calls, Conditional Execution, Iteration Control Construct.





UNIT – V Lexical Syntax Errors, Semantic, Major Issues In
 Optimization, Optimizing , Transformations, Local
 Optimization, Program Flow Analysis, Global Optimization.

### **TEXTS & REFERENCE BOOKS :**

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- INTRODUCTION TO AUTOMATA THEORY, LANGUAGE AND COMUTATION - JOHN E - HOPCOFT, RAJEEV MOTWANI, JEFFERY D. ULLMAN 2ND EDITION
- 2. COMPILER CONSTRUCTION PRINCIPLES & PRACTICE D.M. DHAMDHERE 2ND EDITION
- 3. PRINCIPLES OF COMPILER DESIGN AFFRED V. AHO, JEFFERY D. ULLMANCOMPILERS PRINCIPLES, TECHNIQUES AND TOOLS – AFFRED V. AHO RAVI SETHI, JEFFERY D. ULLMAN



M. Sc. IV Sem(Computer Science) Paper-III : ASP.NET AND C#

- UNIT I Overview of ASP.NET framework, Understanding ASP.NET Controls, Applications Web servers, installation of IIS. Web forms, web form controls -server controls, client controls, web forms & HTML, Adding controls to a web form ,Buttons, Text Box , Labels, Checkbox, Radio Buttons, List Box, etc. Running a web Application, creating a multiform web project.
- UNIT-II Form Validation: Client side validation, server Side validation, Validation Controls : Required Field Comparison Range. Calendar control, Ad rotator Control, Internet Explorer Control. State management- View state, Session state, Application state,
- UNIT-III Architecture of ADO.NET, Connected and Disconnected Database, Create Connection using ADO.NET Object Model, Connection Class, Command Class, Data Adapter Class, Dataset Class. Display data on data bound Controls and Data Grid. Database Accessing on web applications: Data Binding concept with web, creating data grid, Binding standard web server controls. Display data on web form using Data bound controls.



- **UNIT-IV** Writing datasets to XML, Reading datasets with XML.Web services: Introduction, Remote method call using XML, SOAP, web service description language, building & consuming a web service, Web Application deployment.
- **UNIT-V** Overview of C#, C# and .NET, similarities & differences from JAVA, Structure of C# program. Language features: Type system, boxing and unboxing, flow controls, classes, interfaces, Serialization, Delegates, Reflection.

#### **TEXT BOOKS and REFERENCE BOOKS**

- 1. VB.NET Black Book by steven holzner -dreamtech
- 2. ASP.NET Unleashed
- 3. C# programming Wrox publication
- 4. C# programming Black Book by Matt telles





#### M. Sc. IV Sem(Computer Science)

#### Elective Paper-IV(i) Artificial Intelligence and Expert Systems

- UNIT-I General issues and overview of AI, AI Techniques, AL problems, AI Techniques, importance and areas of AI, problem solving state space search-DLF, BFS Production system, problem characteristics. Heuristic Search Techniques: Generate and Test, Hill Climbing, Best First Search, Problem reduction, Constraint satisfaction- Crypt arithmetic and problems.
- UNIT-II Knowledge representation & mapping, approaches to knowledge to representation, issues in knowledge representation, Representing simple facts in logic, representing instance and relationships, Resolution and natural deduction Representing knowledge using rules, Procedural v/s Declarative knowledge, Logic programming, Forward v/s Backward chaining, Matching & control knowledge.
- UNIT-III AI programming language: Prolog- objects, relationships, facts, rules and variables, Prolog: Syntax and data structures, representing objects & relationships by using "trees" and "lists", use of cut, I/O of characters and structures. Symbolic reasoning under uncertainty: Introduction to monotonic reasoning, Logics for Nonmonotonic reasoning, implementation issues, implementation: DFS & BFS.



- **UNIT-IV** Slot and filler structures: Semantic nets, frames, conceptual dependency, scripts, CYC Natural languages and NLP, Syntactic processing parsing techniques, semantic analysis case grammar, augmented transition net, discourse & pragmatic processing, translation.
- **UNIT-V** Definition and characteristics of Expert System, representing and using domain knowledge, Expert system shells Knowledge Engineering, knowledge acquisition, expert system life cycle & expert system tools, MYCIN & DENDRAL examples of expert system



### M. Sc. IV Sem(Computer Science)

### Elective Paper-IV(ii) DATA WAREHOUSING AND MINING

- Unit I Need for strategic information, Decision support system, Knowledge discovery & decision making, need for data warehouse, definitions of Data warehousing and data mining, common characteristics of Data warehouse, Data Marts, Metadata, Operational versus analytical databases, trends and planning of Data warehousing.
- Unit II Defining business requirements, Data modeling strategy, Fact tables, dimensions, Star schema and other schemas, Multi dimensional data models, Data Cube presentation of fact tables, using the Data warehouse, Designing tools for Data warehouse, OLAP models and operations.
- Unit III Architectural components, Infrastructure: Operational & Physical, Extraction, Transformation and Loading, Components of an Oracle Data warehouse, Data Transformation Functions, DBA responsibilities, Capacity Planning.





- Unit IV Implementation of Data warehouse, Physical design: steps, considerations, physical storage, indexing, Performance Optimization, Data warehouse deployment activities, Data security, backup and recovery concepts, Data warehouse Maintenance.
- Unit V Basics of data mining, related concepts, Data mining techniques, Data Mining Algorithms -- Classification, Clustering, and Association rules, Knowledge Discovery in databases( KDD) Process, Introduction to Web Mining:

#### **REFERENCE BOOKS:**

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- 1. Data Warehousing Fundamentals, by Paulraj Ponnian, John Wiley.
- 2. Data warehousing with oracle by sima yazdani shirley s. Wong

#### **TEXTS BOOKS:**

- 1. Data Mining Concepts and Techniques, Han Kamber, Morgan Kaufmann
- 2. Introduction to Business Intelligence and Data Warehousing, PHI
- 3. The Data Warehouse Lifecycle toolkit, Ralph Kimball, John Wiley.



