NOTIFICATION

No. 44 / 2018 Date: 7/ 6 /2018

Subject : Introduction of new syllabi for B.Sc. Part-II (Semester-III & IV) Computer Science / Computer Application/ Information Technology which to be implemented from the academic session 2018-19.

It is notified for general information of all concerned that the authorities of the University has introduced new syllabi for B.Sc. Part-II (Semester-III & IV) Computer Science / Computer Application/ Information Technology), which to be implemented from the academic session 2018-19. Hence the page Nos. 98 to 102, appearing in prospectus No. 2015122 be substituted respectively by the **"APPENDIX"**, which is appended with this notification.

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Sd/-
(Dr.A.P.Deshmukh)
Registrar,
Sant Gadge Baba Amravati University

APPENDIX
Syllabus prescribed for B.Sc. Part II (Semester-III & IV) Computer Science / Computer Application/ Information Technology to be implemented from the Academic Session 2018-19 & onwards.

B.Sc. Part-II (Semester-III)

The Examination in Computer Science of Third Semester shall comprise of one theory paper of 80 Marks of three hours duration and internal assessment of 20 Marks. The practical examination will be of 4 Hrs. duration and carry 50 Marks.

The distribution of marks for practical examination is as under:

1. Program writing / execution (on group A & B) : 30 Marks
2. Practical record : 10 Marks
3. Viva Voce : 10 Marks

Total 50 Marks

3S: Computer Science / Computer Application/ Information Technology
Data Structure and C++

Unit I : Data structure: Introduction to data structure, types of data structure: primitive and non primitive, linear and non linear data structure, data structure operations.
Linear arrays: Definition and concepts, representations, operations on arrays: traversing, inserting, deleting.
Stacks: Definition and concepts, representations, operations on stacks: Push , Pop.

Unit II: Queues: Definition and concepts, representations, operations: Insert and delete; concept of circular queue, dequeue, priority queue. **Linked List:** Introduction, implementation of linked list, types of linked list: single, circular and doubly linked list. Operations on linked list: Insert, Delete, Search.

Unit III: Trees: Definition and concept, binary tree, traversing operations: in order, pre-order, post-order **Sorting and Searching:** Definition and concept, **sorting techniques:** bubble,
selection, insertion, merge and quick sort. **Searching techniques:** Sequential and binary searching.

Unit IV : Object Oriented Programming: features, advantages and applications of oops. Introduction to C++, Program structure in C++. **Classes and Objects:** classes and objects specifiers, defining data member and member functions; accessing members. **Managing console I/O :** Formatted and Unformatted, Usage of manipulators, memory allocation operators: new and delete, scope resolution operator.

Unit V: Functions in C++: Passing objects to and returning objects from functions. Function overloading and default argument, Inline function, Friend function. Array of Objects, Pointer to objects, 'this' pointer. Constructor and Destructor: Types of constructor, Usage of Constructor.

Unit VI : Operator Overloading : Definition, Overloading unary and binary operators. **Inheritance:** Definition, Visibility mode; Types of inheritance with example, virtual base classes and abstract base classes.

Books Recommended:
1. An introduction to data structure with application: Jean-paul Trembley, Paul G Soresan Mc Graw Hill Publication.
2. Data structures : Horowitz, Sahani, Galgotia Publication
3. Data structure and algorithms : Aho, Hopcroft, Ulman

4. Introduction to Data structure : Bhagat Singh, Mops
5. Object Oriented Programming with C++ : E Balagurusamy TMH
6. Mastering in C++ by K. R. Venugopalan
7. Programming with C++ by R. S. Nisar Ali.

Practical : Minimum 16 Practical base on

A: Unit I , Unit II and Unit III (Minimum 8 practical using C Programming Language)
B: Unit IV, Unit V and Unit VI (Minimum 8 practical)

B.Sc. Part-II (Semester-IV)

The Examination in Computer Science of Fourth Semester shall comprise of one theory paper of 80 Marks of three hours duration and internal assessment of 20 Marks. The practical examination will be of 4 Hrs. duration and carry 50 Marks.

The distribution of marks for practical examination is as under:

1. Program writing / execution (on group A & B) : 30 Marks
2. Practical record : 10 Marks
3. Viva Voce : 10 Marks

Total 50 Marks

4S: Computer Science / Computer Application/ Information Technology

RDBMS and PL/SQL

UNIT-I : Fundamental of DBMS : Traditional file approach and comparison with DBMS Architecture of a database system, Data base approaches, storage structures, data representation, data independence, database models: Relational, Hierarchical, network, Relational Algebra, Object Based model, data dictionary and Database Administration.

UNIT-II: Relational Model : Relations, Domains and Attributes, keys, E-R diagrams, Reducing E-R diagrams to tables, function dependency, Entity, Relationship, Mapping Constraints, **Normalization:** 1NF, 2NF, 3NF, 4NF, BCNF.

UNIT-III : Introduction to SQL : Components of SQL, data types, operators, **DDL Commands :** CREATE, ALTER, DROP, RENAME for tables. Data Integrity and types of integrity constraints. **DML Commands:** SELECT, INSERT, DELETE & UPDATE; **Clauses:** ORDER By, GROUP By and Having clause.

UNIT-IV :Functions : Number Functions: AVG, MAX, MIN, SUM, COUNT, TO-NUMBER, GREATEST, LEAST, ABS, MOD, FLOOR, CEIL, TRUNC, SQRT, SIGN, SIN, COS, LOG, EXP.
Character Function : INITCAP, LOWER, UPPER, INSTR, LENGTH, LTRIM, RTRIM, LPAD, RPAD, SOUNDEX, **Conversion Functions:** TO_Number, TO_Character, DECODE. **Date functions:** ADD_Months, Last_Day, Months_Between, Next_Day, Sys_Date, New_Time. Joins : Self join, equijoin and outer join.

UNIT-V: PL/SQL: Features and block structure, variables and constant, data types, control structure. **Cursor:** Concepts of cursor, types, declaring, opening, using cursors, fetching data, closing a cursor, cursor attributes. **Trigger:** create, Types, Creating Before and After Trigger,

UNIT-VI: Transaction: Rollback, commit and save point, rollback segment. Create Procedure and create function. **Securities of Database:** Users, creating users, roles, creating roles, types of privileges, GRANT, REVOKE command, Table and Row Locking.

Books Recommended:

1. Fundamentals of Database Systems (4th Ed) By: Elmasri and Navathe
2. Database System Concepts (4th Ed) By: Korth, Sudarshan, Silberschatz
3. Beginning Databases with PostgreSQL, From Novice to Professional, 2nd Edition By Richard Stones , Neil Matthew, Apress
4. Introduction to Database Management Systems by Muzumdar TMH
5. Oracle Developer 2000 by Ivan Byross
6. An Introduction to Database Systems by Bipin C. Desai, Galgotia Publication.
7. Database System Using Oracle: A simplified Guide to SQL & PL/SQL : Nilesh Shah, PHI Publication

Practical : Minimum 16 Practical base on

A: Unit II & III (Minimum 8 practical)
B: Unit IV, Unit V and Unit VI (Minimum 8 practical)

Syllabus prescribed for B.Sc. Part II (Semester-III & Iv) Computer Application (Vocational) to be implemented from the Academic Session 2018-19 & onwards.

B.Sc. Part-II (Semester-III)

The Examination in vocational subject Computer Application of Third Semester shall comprise of one theory paper of 80 Marks of three hours duration and internal assessment of 20 Marks. The practical examination will be of 4 Hrs. duration and carry 50 Marks.

The distribution of marks for practical examination is as under:

1. Program based on Computer lab I : 15 Marks
2. Program based on Computer lab II : 15 Marks
3. Practical record : 10 Marks
4. Viva Voce (based on lab I & lab II) : 10 Marks

Total 50 Marks

3S: Computer Application (Vocational)

OOPS with Java Programming

UNIT I Introduction to OOPS: Object Oriented Programming Paradigm, Basic Concepts of OOPs, Benefits and applications of OOPs. **Introduction to Java :** History, Benefits and applications, features, Java environment, Java Byte codes, Java virtual Machine, Security, Platform independence and portability, Java Support System.

UNIT II
Java character set, keywords, Identifies, constants, variables, operators and expressions, separators, Data types, Type conversion and casting. **Java Statements:** Assignment statement, control statements, structure of Java program.
Methods of Java programming: Application (main) and applet methods, simple Java program.

UNIT III
Classes, defining a class, adding variables and methods, creating objects, accessing class members, constructors, the 'this' keyword, Garbage collection. The finalize() method, method overloading, static members, inheritance, method overriding, abstract methods and classes

UNIT IV
Array: Declaration and initialization of one dimensional and multi-dimension arrays, strings, different operations on arrays. **Packages:** Introduction, Java API packages, creating accessing & using a package, adding a class to a package.

UNIT V
Multithreading: Introduction, creating threads & multiple threads. **Error and Exception Handling :** Introduction, Fundamental of exception handling, types of errors, types of exceptions, uncaught exception, using try and catch, multiple catch clauses, nested try statement, built-in exceptions, creating your own exception.

UNIT VI
Applet Programming: Applet basics, difference between applets and applications, writing applets, applet code, applet life cycle, creating an executable applet, and applet tag, running the applets.

Books Recommended :

1) The Complete Reference JAVA2 by Herbert Schildt (Tata McGraw)
2) The Complete Reference JAVA by Patrik Noughton
3) Programming with JAVA - A Primer : By E.Balguruswamy (Tata McGraw)
4) Programming in JAVA : By S.S.Khandare (S.Chand)
5) Teach Yourself 'Java' in 2 Hrs : By Sams.
6) Java for You : By P. Koparkar

Practical : Minimum 16 Practical base on
Lab I: Unit I , Unit II and Unit III (Minimum 8 practical)
Lab II: Unit IV, Unit V and Unit VI (Minimum 8 practical)

B.Sc. Part-II (Semester-IV)

The Examination in vocational subject Computer Application of Fourth Semester shall comprise of one theory paper of 80 Marks of three hours duration and internal assessment of 20 Marks. The practical examination will be of 4 Hrs. duration and carry 50 Marks.

The distribution of marks for practical examination is as under:

1. Program based on Computer lab I : 15 Marks
2. Program based on Computer lab II : 15 Marks
3. Practical record : 10 Marks
4. Viva Voce (based on lab I & lab II) : 10 Marks

Total 50 Marks

4S : DATABASE MANAGEMENT SYSTEM

UNIT-I : Fundamental of DBMS : Introduction, Traditional file oriented approach, DBMS components and architecture, data independence, database models: Relational, Hierarchical, network; Object Oriented Model.

UNIT-II : Relational Model : Relations, Domains and Attributes keys, E-R diagrams, Reducing E-R diagrams to tables, function dependency, Normalization Process, Normal forms : 1NF, 2NF, 3NF, 4NF, BCNF.

UNIT-III: Introduction to SQL: Components of SQL, data types, operators **DDL Commands**: CREATE, ALTER, DROP, RENAME, for tables & views. **DML Commands**: SELECT, INSERT, DELETE & UPDATE; **Clauses**: ORDER BY, GROUP BY and HAVING; **DCL and TCL Statements:** Grant, Revoke, Rollback, commit and auto commit, save point, rollback segment.

UNIT-IV: Data Integrity, types of integrity constraints. **Functions: Number Functions** - AVG, MAX, MIN, SUM, COUNT, TO-NUMBER, ABS, MOD, FLOOR, CEIL, TRUNC, SQRT, SIGN, SIN, COS, LOG, EXP. **Character Functions:** INITCAP, LOWER, UPPER, INSTR, LENGTH, LTRIM, RTRIM, LPAD,RPAD, SOUNDEX. **Date functions**: ADD_MONTHS, LAST_DAY, MONTH_BETWEEN, NEW_TIME, NEXT_DAY, SYS_DATE **Miscellaneous Functions:** GREATEST, LEAST,DECODE, NVL, NULLIF **Joins and Unions:** Self, equi and outer join, unions and intersection.

UNIT-V : PL/SQL : Features and block structure, variables and constant, data types, Identifiers, Operators and expression, Conditional statement, iterative statement. **Cursor :** Concepts of cursor, types of cursor, declaring, opening, using cursors, fetching data, closing a cursor, cursor attributes, Handling Exceptions, Creating Procedures, Creating Function, Managing Subprogram, Creating Packages, Package Concepts,
Triggers: Create Triggers, Types of Triggers, Creating BEFORE and AFTER Triggers, INSTEAD-OF triggers, Trigger Predicates, Inserting, Updating and Deleting Triggers, Enabling, Disabling and Dropping triggers.

UNIT-VI: Securities of Database: Introduction to database security concepts, Methods for database security, Discretionary access control method, Mandatory access control and role base access control for multilevel security, Use of views in security enforcement, Overview of encryption technique for security, Statistical db security.

References:-

1. Fundamentals of Database Systems (4th Ed) By: Elmasri and Navathe
2. Database System Concepts (4th Ed) By: Korth, Sudarshan, Silberschatz
3. MySQL The Complete Reference By Vikram Vaswani
4. Learning MySQL by O'reilly
5. MySQL in Nut Shell by Dyer 2nd Edition
6. Database System Using Oracle: A simplified Guide to SQL & PL/SQL : Nilesh Shah, PHI Publication

Practical : Minimum 16 Practical base on

A: Unit II & III (Minimum 8 practical)
B: Unit IV, Unit V and Unit VI (Minimum 8 practical)

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NOTIFICATION

No. 45 / 2018 Date: 7/ 6 /2018

Subject : Introduction of new syllabi for M.Sc. Part-II (Sem. III & IV)(Computer Software), which to be implemented from the academic session 2018-19.

It is notified for general information of all concerned that the authorities of the University has introduced new syllabi for M.Sc. Part-II (Sem. III & IV)(Computer Software), which to be implemented from the academic session 2018-19. Hence the page Nos. 9 to 17, appearing in prospectus No. 20161210 be substituted respectively by the **"APPENDIX"**, which is appended with this notification.

Sd/-
(Dr.A.P.Deshmukh)
Registrar,
Sant Gadge Baba Amravati University

APPENDIX

Syllabus prescribed for M.Sc. Part II (Semester-III & IV) (Computer Software) to be implemented from the Academic Session 2018-19 & onwards.

M.Sc.-Part II (Semester III & IV) Computer Software
Theory

Semester	Paper	Title of Paper
III	3S1	Data Warehouse and Data Mining
	3S2	PHP Programming
	3S3	Mobile Computing with Android
	3S4	Elective: 1. Computer Graphics 2. Compiler Construction
IV	4S1	Cyber Security & Digital Forensic
	4S2	Soft Computing
	4S3	Web Content Management System
	4S4	Elective: 1. Cloud Computing 2. Design and Analysis of Algorithms

Practical:

Semester-III	Lab-1	Practical Based on Paper- 1 & 2
	Lab-2	Practical based on Paper- 3 & 4
Semester-IV	Lab-1	Practical Based on Paper- 1 , 2 & 3
	Lab-2	Project

Syllabus Prescribed for M.Sc. [Computer Software]
Semester-III
Paper-3S1 – Data warehouse & Data Mining

Unit I: Recent amendments in IT Act, internet & web technologies, web hosting and development, attributes in cyberspace and legal framework of cyberspace, hacking, virus, obscenity, pornography, programme manipulation, Copyright, Patent, software piracy, intellectual property rights, trademark, domain disputes, and computer security, etc.

Unit II: Encryption and Decryption methods. Search and seizures of evidence. Investigation of cyber crimes and tools for analysis. Information security: Domains, Common Attacks, Impact of Security Breaches. Protecting Critical Systems (Information Risk Management, Risk Analysis etc) Information Security in Depth Physical security (Data security Systems and network security)

Unit III: Program Security: Secure programs, Non-malicious program errors, Viruses and other malicious code, Targeted malicious code, Controls against program threats File protection mechanism, Authentication: Authentication basics, Password, Challenge response, Biometrics. Network Security: Threats in networks, Network security control, Firewalls, Intrusion detection systems, Secure e-mail, Networks and cryptography, Example protocols: PEM, SSL, IPsec.

Unit IV: Principles of network forensics, Attack Trace back and attributes, Critical Needs Analysis. IDS: Network based Intrusion Detection and Prevention Systems, Host based Intrusion Previnsion System. Cloud Computing-Its Forensic and Security Aspects.

Unit V: Cyber Crime Investigations: Where Evidence Resides on Windows systems, Conducting a Windows investigation, File Auditing and Theft of information, Handling the Departing Employee, Steps in a Unix Investigation, Reviewing Pertinent Logs, Performing Keywords Searches, Reviewing Relevant Files, Identifying Unauthorized User Accounts or Groups, Identifying Rogue Processes, Checking for Unauthorized Access Points, Analyzing Trust Relationships, Detecting Trojan Loadable Kernel Models. Finding Network based Evidence, Generating Session data with TCP Trace, Reassembling sessions using TCP flow and Ethereal.

Unit VI: Open source tools for digital forensics and Registry Forensic- Open source, Open source examination platform, preparing the examination system, using LINUX and Windows as host, Study of Sleuth Kit: Installing Sleuth Kit, Sleuth Kit tools (Volume layer tools, File system Layer tools, Data unit Layer tools, Metadata Layer Tools) Registry Analysis, Understanding Windows Registry and Registry Structure.

Books:

1. C. P. Pfleeger, and S. L. Pfleeger, ―Security in Computing‖, Pearson Education.
2. Computer Forensic Investigating Data and Image Files, EC Council Press
3. Robert Jones, Internet Forensics Using Digital Evidence to Solve Computer Crimes, O'Reilly Media Publication
4. Forouzan Data Communication and Networking McGraw Hill
5. Stallings, ―Cryptography And Network Security: Principles and practice‖
6. Kevin Mandia, Chris Prosise and Matt Pepe, Incident response and computer forensics, McGraw Hill Publication
7. Cory Altheide, Harlan Carvey, Digital Forensics with Open source Tools, Syngress Publication
8. Michael E Whitman and Herbert J Mattord, ―Principles of Information Security‖, Vikas Publishing House, New Delhi, 2003
9. Micki Krause, Harold F. Tipton, ― Handbook of Information Security Management‖, Vol 1-3 CRC

Paper-3S2 – PHP Programming

UNIT-I - Introduction to PHP: Features of PHP, Server Introduction of PHP, Installation & Configuration of PHP, PHP Ethics , Fundamentals of PHP: Keywords in PHP, Variables (Predefined, User defined), Constants, data types in PHP , Operators in PHP: Arithmetic/math operators, Assignment Operators, Comparison Operators, Logical Operators, Bitwise Operators, String Operator

UNIT-II - Control Structures in PHP: if, if..else, if..else..if, Loops in PHP: while, do.. while, for, foreach, Functions in PHP: Introduction to Functions in PHP, function Declaration, Function calling, predefined functions in PHP (crypt (), move up loaded file (), isset(), empty(),include(), require())

UNIT-III - Introduction to arrays in PHP: What is array, Declaration of array, Types of array: Numeric array, Associative array, Multidimensional Array, Array Functions: print_r(), explode (), implode (), array_merge(), array_sum(),array_search(), array_push(), array_pop()

UNIT-IV- String Handling: Introduction to strings in PHP, Manipulation on string: Concatenation Operator for string, strlen(),strrev(),substr(),strops(), Receiving input from user: Introduction to HTML forms, GET & POST methods with HTML forms, File Upload in PHP using file attributes (name, type, size, tmp_name)

UNIT-V - Sessions, Cookies in PHP, mail(),Error Handling, Bugs debugging, Date and Time File Handling in PHP: Opening file, closing file, writing data into file, reading data from a file,

UNIT-VI – PHP with MySQL : Introduction to Mysql database: Database connection with PHP , functions of MySQL: mysql_connect() , mysql_select_db(), mysql_query(), mysql_result(), mysql_fetch_array(),mysql_error(), mysql_num_rows()

Books:

1. The Complete Reference PHP :
2. Learning PHP , My SQL & Java Script – Robin Nicson (Orelly)
3. PHP for Web – Visual Quickstart Guide- Larry Ullman
4. PHP & My SQL Web Development – A.Martin, S. Mathews

Paper-3S3 – Mobile Computing with Android
Unit –I

Getting an Overview of Android : Fundamentals of Java for Android Application Development , System Requirements for Windows, Mac OS X and Linux, Installing Java ,Installing Java for Windows OS ,Installing Java for Mac OS X ,Installing Java for Linux ,Installing Android Studio, Installing Android Studio for Microsoft Windows 10 , Installing Android Studio for Mac OS X, Installing Android Studio for Linux, Launching Android Studio for the First Time , Welcome to Android Studio, Stand-alone, SDK Installation.

Unit-II
Working with the User Interface, Using Views and View Groups, Handling Pictures and Menus with Views Android Studio Basics, Creating a New Sample Project, Using Different SDKs, Android Project Structure, Building and Running a Project, Android Emulator, Installing HAXM, Creating a New Android Virtual Device, Using ADB, Migrating Projects from Eclipse.

Unit –III
Storing the Data Persistently, Emailing and Networking in Android,Working with Location Services and Maps, Working with Graphics and Animation, Audio, Video and Camera, Threads and Services, Android Application Development with Android Studio, Android Projects, Creating a New Android Projec, Creating a Project with Multiple Target Devices, Launching Android Applications, Android Activities, The Intent Event Handler, Android Modules.

Unit-IV
Bluetooth, NFC, and Wi-Fi, Telephony and SMS, Hardware Sensors, Debugging Android Code, Android Debug Bridge, Wireless Debugging, Start Debugging, Android Monitor, Using log cat, Using Memory Monitor, Using CPU Monitor, Using GPU Monitor, Using Network Monitor, Android Device Monitor, Android Virtual Device Extended Controls, Using Lint, Testing Android Code and Application UIs, Unit Tests, Integration Tests, UI Tests, Performance Testing, Performance Tests Task. Introduction to GIT, Understanding GIT, Installing GIT, Using GIT, Using the GitHub Client, Using GIT in Android Studio, GIT Flow.

Unit-V
Working with NDK: Hardware Sensors, Widgets and Live Wallpapers in Android, Introduction to Android NDK, Android Studio NDK Integration, Android NDK Installation on Linux, Android NDK Installation on Windows 10, Android NDK Installation on Mac OS X, Android NDK with Android Studio Projects, Importing a Sample NDK Project, Migrating an Existing NDK Project, Building Android NDK Projects, Android NDK Projects Release and Deployment, Multi vs. Fat Android Application APKs, Publishing, Monetizing and Distributing Android Applications.

Unit-VI
Developing For Android Tablets and Smart phones, The Relational Model and SQLITE, Android Database Support, Content Providers Rest, Content Providers, Concurrency, Networking and Sync Adapters, Service Development, Mobile and the Cloud, Complex Device-Based Data: Android Contacts, Generic Data Synchronization: Project Migrate and the Web data
API, Web data Applications Building Human Interfaces for Data.

Books:

1. Android Application Development (With Kitkat Support), Black Book
by Kogent Learning Solutions Inc. Pradeep Kothari
2. Expert Android Studio by Murat Yener, Onur Dundar
3. Enterprise Android: Programming Android Database Applications for the Enterprise
by Zigurd Mednieks, G. Blake Meike, Laird Dornin, Zane Pan.

Paper-3S4- Elective

1. Computer Graphics

Unit I : Geometry and line generation: Introduction, points and lines, planes and coordinates, Line segments, perpendicular line segments, vectors, pixels and frame buffers, vector generation, character generation, displaying the frame buffer. Graphics primitive: Introduction, display devices, primitive operations, the Display-File Interpreter, normalized device coordinates, Display-file structure, Display control, Text line style primitives.

Unit II : Polygon: Introduction, Polygon , Polygon representation, Entering polygon, An inside test, filling polygon, initializing. Transformations: Introduction, matrices, scaling transformations, sin and cos, sum of angles, identifiers, rotation, homogeneous coordinates and translation, rotation about an arbitrary point, other transformations, display procedures.

Unit III: Segments: Introduction, the segment table, segment creation, closing a segment, deleting a segment, renaming a segment, visibility, image transformations, saving and showing segments, other display file structures, some rater techniques, Windowing and clipping: Introduction, viewing transformation, implementation, clipping, clipping the polygon, adding clipping to the system, a voiding division, generalized clipping, position relative to an arbitory line, multiple windowing,

Unit IV: Interaction : Introduction, hardware, input devices, handling algorithm, event handling, sample devices, the detectability attributes, simuating a locator with a pick and pick with a locator, Echoing, Interactive techniques. Three dimension: Introduction, 3D Geometry, primitives and transformations, rotation about an arbitrary axis, parallel projection, perspective projection, viewing parameters, conversion to view plane coordinates, The 3D viewing transformation, , special projection.

Unit V : Hidden surfaces and lines: Introduction, back face removal, the painter algorithm, collection of polygons, remembering the style, the hidden surface check, decomposition into triangles, comparing two triangles, The minima test, Overlapping edges, containment of points, finding a point in the triangle plane, comparing of the entire triangle, establishing depth order, geometrical sorting, linked list, sorting the triangles.

Unit VI: Shading: Introduction, diffusion, illumination, point source illumination, specular reflection, transparency and shadows. Curves: Introduction, curve generation, implementation, interpolating polygons, E-splines, B-Splines and Curves.

Books:

1. " Computer Graphics A Programming approach"- Steven Harington.
2. " Interactive Computer Graphics"- Newmann and Sproul
3. " Computer Graphics"- Rogers.

2. Compiler Construction

Unit I : Introduction to Compilers**:** Overview, typical compiler Structure, Implementation. Programming Language Grammars: Elements of formal language grammars, derivation, reduction, syntax tree, ambiguity, regular grammars and expressions.

Unit II : Scanning and Parsing Techniques: The scanner, top-down and bottom-up parsing, syntax directed translation, Symbol table organization, Hash table organization, Linked List and Tree structured symbol tables, symbol table organization for structures and records.

Unit III : Memory Allocation: Static and dynamic memory allocation,array allocation and access, allocation for strings, structure allocation, common and equivalence allocation. Compilation of expressions.

Unit IV : Compilation of control structures: Control transfers, procedural calls, conditional execution, iteration control constructs.

Unit V : Error detection, indication and recovery. Compilation of I/O statements: Compilation of I/O list, compilation of FORMAT list, the I/O routine, file control.

Unit VI : Code optimization: Major issues, optimizing transformations,local optimizations, program flow analysis, Global optimization, writing compilers

Books:

1. Compiler construction – D.M. Dhamdhere, Macmillan India Ltd.
2. Principles of Compiler Design – Alfred V. Aho, Jeffrey D. Ullman
3. The Theory and Practice of Complier Writing – J.P. Trembly, P.G. Sorenson McGraw Hill Publication
4. Engineering a compiler – K.D.Cooper and Linda Torczon, Elsevier Direct Publ.

Syllabus Prescribed for M.Sc. [Computer Software]

Semester-IV
Paper-4S1-Cyber Security & Digital Forensic

Unit I: Recent amendments in IT Act, internet & web technologies, web hosting and development, attributes in cyberspace and legal framework of cyberspace, hacking, virus, obscenity, pornography, programme manipulation, Copyright, Patent, software piracy, intellectual property rights, trademark, domain disputes, and computer security, etc.

Unit II: Encryption and Decryption methods. Search and seizures of evidence. Investigation of cyber crimes and tools for analysis. Information security: Domains, Common Attacks, Impact of Security Breaches. Protecting Critical Systems (Information Risk Management, Risk Analysis etc) Information Security in Depth Physical security (Data security Systems and network security)

Unit III: Program Security: Secure programs, Non-malicious program errors, Viruses and other malicious code, Targeted malicious code, Controls against program threats File protection mechanism, Authentication: Authentication basics, Password, Challenge response, Biometrics. Network Security: Threats in networks, Network security control, Firewalls, Intrusion detection systems, Secure e-mail, Networks and cryptography, Example protocols: PEM, SSL, IPsec.

Unit IV: Principles of network forensics, Attack Trace back and attributes, Critical Needs Analysis. IDS: Network based Intrusion Detection and Prevention Systems, Host based Intrusion Previnsion System. Cloud Computing-Its Forensic and Security Aspects.

Unit V: Cyber Crime Investigations: Where Evidence Resides on Windows systems, Conducting a Windows investigation, File Auditing and Theft of information, Handling the Departing Employee, Steps in a Unix Investigation, Reviewing Pertinent Logs, Performing Keywords Searches, Reviewing Relevant Files, Identifying Unauthorized User Accounts or Groups, Identifying Rogue Processes, Checking for Unauthorized Access Points, Analyzing Trust Relationships, Detecting Trojan Loadable Kernel Models. Finding Network based Evidence, Generating Session data with TCP Trace, Reassembling sessions using TCP flow and Ethereal.

Unit VI: Open source tools for digital forensics and Registry Forensic- Open source, Open source examination platform, preparing the examination system, using LINUX and Windows as host, Study of Sleuth Kit: Installing Sleuth Kit, Sleuth Kit tools (Volume layer tools, File system Layer tools, Data unit Layer tools, Metadata Layer Tools) Registry Analysis, Understanding Windows Registry and Registry Structure.

Books:
1. C. P. Pfleeger, and S. L. Pfleeger, ―Security in Computing‖, Pearson Education.
2. Computer Forensic Investigating Data and Image Files, EC Council Press
3. Robert Jones, Internet Forensics Using Digital Evidence to Solve Computer Crimes, O'Reilly Media Publication
4. Forouzan Data Communication and Networking McGraw Hill
5. Stallings, ―Cryptography And Network Security: Principles and practice‖
6. Kevin Mandia, Chris Prosise and Matt Pepe, Incident response and computer forensics, McGraw Hill Publication
7. Cory Altheide, Harlan Carvey, Digital Forensics with Open source Tools, Syngress Publication
8. Michael E Whitman and Herbert J Mattord, ―Principles of Information Security‖, Vikas Publishing House, New Delhi, 2003
9. Micki Krause, Harold F. Tipton, ― Handbook of Information Security Management‖, Vol 1-3 CRC

Paper-4S2-Soft Computing

Unit-I: Soft Computing: Introduction to soft computing, requirement, different tools and techniques, Soft computing Constituents, Characteristics of Neuro Computing and Soft Computing, Difference between Hard Computing and Soft Computing, usefulness and applications.

Unit-II: Neural Networks Basics of Neural Networks: Introduction to Neural Networks, Biological Neural Networks, McCulloch Pitt model, Supervised Learning algorithms: Perceptron (Single Layer, Multi layer), Linear separability, Delta learning rule, Back Propagation algorithm, Un-Supervised Learning algorithms: Hebbian Learning, Winner take all, Self Organizing Maps, Learning Vector Quantization.

Unit-III: Artificial Neural Network: Introduction, basic models, Hebb's learning, Adaline, Perceptron, Multilayer feed forward network, Back propagation, Different issues regarding convergence of Multilayer Perceptron, Competitive learning, Self-Organizing Feature Maps, Adaptive Resonance Theory, Associative Memories, Applications.

Unit-IV: Fuzzy Logic : Crisp set and Fuzzy set, Basic concepts of fuzzy sets, membership functions. Basic operations on fuzzy sets, Properties of fuzzy sets, Fuzzy relation. Hybrid System and its applications. Fuzzy relations and relation equations, Fuzzy numbers, Linguistic variables, Fuzzy logic, Linguistic hedges, Applications, fuzzy controllers, fuzzy pattern recognition, fuzzy image processing, fuzzy database.

Unit V :Introduction Basics of MATLAB, General Commands, Interactive Computation: Matrices and Vectors, Input, Indexing(or subscripting),Matrix manipulation, Creating vectors, Matrix and Array operations: Arithmetic operations, Relational operations, Logical operations, Elementary math functions ,Matrix functions, Character string, Array operations: Vectorization, Command line functions, using built in functions and on-line help, saving and loading data, plotting simple graph

Unit VI: Programming in MATLAB: Scripts and Functions: Script Files, Function Files: Executing a function, More on functions, sub functions, compiled function, the profiler , Language-specific features: Comments, continuation, global variables, loops, branches and control flow, Interactive input, recursion ,input/output, Advanced Data objects: Multidimensional matrices, structures, cells.

Graphics: Basic 2-D Plots: Style options, Labels, title, legend and other text objects, Axis control, zoom in, zoom out, modifying plots with the plot editor, overlay plots, specialized 2-D plots, Using subplot for Multiple Graphs,3-D Plots ,Handling Graphics :object handles, object properties, modifying an existing plot, complete control over the graphics layout, saving and printing graphs, Animation.

Books:
1.Principals of Soft Computing S M Deepa & S N Sivanandam (Wiley)
2. "Neural Networks, Fuzzy Logic and Genetic Algorithms" S.Rajasekaran and G.A.Vijayalakshmi Pai (PHI Learning.)
3. "Neural Networks A Classroom Approach" Satish Kumar (Tata McGrawHill).
4. "Fuzzy Set Theory and its Applications" Zimmermann H.S (Kluwer Academic Publishers.)
5.Getting started with MATLAB7. Rudra Pratap (Oxford)
6.Essentials of matlab programming. Stephen J Chapman.

Paper-4S3-Web Content Management System

UNIT-I - Introduction to Content Management System(CMS), Web Content Management System(WCMS), features of WCMS, Types of CMS,
Wordpress: Introduction, Features, Installation & Configuration, Dashbord, WordPress Settings: Genaral, Writing, Reading, Discussion, Media, Permalink, Plugin, WordPress Categories: Add, Edit, Delete, Arrange, WordPress Posts, WordPress Media, WordPress Pages, Links, Comments

UNIT-II - WordPress Plugins: View, Install, Customize, WordPress Users: User Roles, Add user, Edit user, delete users, WordPress Appearance, Host Transfer, Version Update, Spam Protection, Backup and restore, Optimization, Reset password

UNIT-III - Joomla: Introduction, Installation & configuration, Control Panel, Toolbars, Menus: Create, Modify, Modules: Create, Breadcrumbs, Feed Display, Footer, Search, Random Image, Syndicate, Joomla Gobal Settings: System, Media, Language, Private, Mass E-mailing, Cash Management, User Settings, Debug

UNIT-IV - Joomla Advanced: Template Managere, Customization, Adding and Creating Templates, Customize logo, category management, adding content, formatting content, article metadata, adding banners, adding contacts, adding forums, Plugin manager, Extension manager, Website Backup.

UNIT-V - Drupal: Introduction, Installation & configuration, Architecture, Main Menu, Blocks and Regions, Themes and layouts, Pages: Front and static, Create Blog, Create articles, Create Content, Modify Content, Publish Content, Manu Management, Taxonomies, Comments, User Management, Optimization, Site Backup, Site Upgrade

UNIT-VI- URL Alias, Site Search, Error Handling, Multilingual Content, Triggers and Actions, Social Networking, Internationalization, Extension, Modules: Default Modules, Pane Modules, Book Module, Aggregator Module, Contact Module, Form Module, Poll Module, Site Security
Drupal E-Commerce- Setup Shopping Cart, Create Products, Create Categories, Setup Taxes and Discounts, Receives Donations, Set up shipping, Set up payments, Invoice Generations, Email notifications, Order History

Books:

1. Word Press:Visual Quickstart Guide By Matt Beck, Jessica Neuman Beck.
2. Professional wordpress: Design & Development By Brad Williams, David Damstra, Hal Sterm, Wrox Publication
3. WordPress Complete By Hasin Hayder, Packt Publishing
4. Learning Joomla 3 Extension Development-Third Edition - by Tim Plummer
5. Joomla Programming By Mark Dexter & Louis Landry
6. Joomla: Beginners Guide By Eric Tiggler
7. The Official Joomla Book By Jennifer Marriot, Elin Waring
8. Mastering Drupal 8 –
9. Beginning Drupal 7- Tom Tomlison, Apress Publishing
10. Drupal-7 by David Mercer, PACKT Publishing

Paper-4S4- Elective

1. Cloud Computing

Unit I: Cloud Computing Fundamental: History of cloud computing, Cloud Computing definition, private, public and hybrid cloud. Applications and challenges of cloud computing.
Types of Cloud Services: IaaS, PaaS, SaaS., Public Cloud Vs Private Clouds.

Unit II: Cloud Architecture: Introduction to Architecture, Benefits and challenges, Application availability, performance, security and disaster recovery; future of Cloud Applications. Desktop and Device Management: Introduction- Objectives, Desktop Virtualization- Across Industries Client Desktops, Desktop placement in the cloud Merits Desktop as a Service (DaaS), Desktop Management Watching the four areas Asset Management.

Unit III: Virtualization: Introduction to Virtualization, Network virtualization techniques, Virtual Machine (VM), VM Components and process of converting physical to VMs, Block virtualization and file level storage virtualization, Virtual LAN (VLAN) and Virtual SAN (VSAN)

Unit IV: Cloud Application Development: Service creation environments, Development environments, Amazon, Azure, Google App. Cloud Applications: Technologies and the processes required when deploying web services; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages. Accessing the Cloud Introduction-Objectives, Platforms Web Application Framework- Web Hosting Services Proprietary Methods, Web Applications API's in Cloud Computing, Browsers for Cloud Computing Internet Explorer Mozilla Firefox Safari Chrome.

Unit V: Cloud Services Management: Reliability, availability and security of services deployed from the cloud. Performance and scalability of services, tools and technologies used to manage cloud services deployment; Cloud Economics : Cloud Computing infrastructures available for implementing cloud based services. Economics of choosing a Cloud platform for an organization, based on application requirements, economic constraints and business needs (e.g Amazon, Microsoft and Google, Salesforce.com, Ubuntu and Redhat)

Unit VI: Cloud Security: Cloud Security Overview, Cloud Security Challenges and Secure Cloud Software Requirements. Risks: Risk Management, Privacy and compliance risk. Software-as-a-Service Security, Security Governance, Security Monitoring, Security Architecture Design. Data Security, Application Security, Virtual Machine Security, Identity Management and Access Control, Autonomic Security.

Books:

1. Toby Velte, Anthony Velte, Robert Elsenpeter, Cloud Computing, A Practical Approach [ISBN: 0071626948].
2. Rajkumar Buyya, Christian Vecchiola, S.TamaraiSelvi, 'Mastering Cloud Computing",TMGH,2013.
3. GautamShroff, Enterprise Cloud Computing Technology Architecture Applications [ISBN: 978-0521137355]
4. Ronald L. Krutz, Russell Dean Vines, "Cloud Security – A comprehensive Guide to Secure Cloud Computing", Wiley – India, 2010.
5. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
6. Kumar Saurabh, "Cloud Computing – insights into New-Era Infrastructure", Wiley India,2011.

2. Design and Analysis of Algorithm

Unit I :
Divide and Conquer: General Method, Binary Search, Finding the maximum and minimum, Merger Sort, Quick Sort, Selection sort, strassen's matrix multiplication.
Unit II :
Greedy Methods, Optimal storage, Knapsack Problem, Job sequencing with deadline, Optimal merge patterns, minimum spanning trees, single source shortest path algorithm.
Unit III :
Dynamic Programming: General Method, multistage graphs, all pair shortest paths, Optimal Binary search trees, 0/1 Knapsack. Reliability design. Traveling salesman problem. Flow shop scheduling.
Unit IV :
Basic search and traversal techniques: General Method, Code Optimization, AND/OR graph, Game trees , Bi-connected Components, Depth first search technique.

Unit V :
Backtracking: General Method, the 8- Queens problem, Sum of subsets. Graph Coloring, Hamiltonian Cycles, Knapsack problem.

Unit VI :
Branch and Bound Techniques: General Method, 0/1 Knapsack Problem, Traveling salesperson problem, Efficiency Considerations. Lower bound theory: comparison trees for sorting and searching.

Books :
1. E. Horowitz & S. Sahani : Fundamentals of Computer Algorithm, (Golgotia)
2. Aho & Ullman : Analysis and Design of Algorithm (Addison- Wesley)
3. Hopcroft : Analysis of Algorithm (Addison- Wesley)
4. D. Knuth : The art of Computer Programming Vol I,II,III (Narosa Publishing)
5. Corman : Design and Analysis of Algorithm (PHI)
6. Aho : data tructure & Algorithm (Addison- Wesley)

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