UNIVERSITY OF MYSORE

REGULATIONS AND SYLLABUS

FOR

M. Sc IN INFORMATION TECHNOLOGY
(M. Sc.IT)

CHOICE BASED CREDIT SYSTEM

EFFECTIVE FROM THE ACADEMIC YEAR 2021-22

UNIVERSITY OF MYSORE

REGULATIONS AND SYLLABUS FOR THE PROGRAM
M. Sc IN INFORMATION TECHNOLOGY (M. Sc. IT)

Semester Scheme - Choice Based Credit System

Effective from the Academic year 2021-22

Regulations: The existing regulations governing the Postgraduate Degree (Science) courses of the University of Mysore are applicable to this course.

Eligible for admission: B. Sc degree with Computer Science or Mathematics as one of the optional/ Any degree with Diploma in Computer Application/Software Development, B.C.A/ B.Tech/ B.E in any discipline with minimum of 45% marks in aggregate (40% in case of SC/ST and Cat-1). The selection of candidates for this course will be based on entrance test.

Duration: Two years (Four Semester)

Faculty: Science and Technology

COURSE OBJECTIVE:

- ❖ During the last decade, the rate of change in information technology has increased. Indeed it is clear that we are now entering an era where explosive change in telecommunication technology combined with ever increasing computing power will lead to profound changes in information systems that support the organizations.

❖ Managing with Information Technology, Management of Information Technology and Systems, Introduction and Diffusion of IT, Strategic Impact of IT, Economics of IS and IT, New Information Technologies and Their Impact on Organizations, Human Factors in Information Systems.

❖ Studying IT is to gain the knowledge of the Problem Solving, Data Modeling; Database Management Systems, Data Mining, Object Oriented Design Methodologies, System Design Methodologies, Artificial Intelligence, EDI, and Internet/WWW Applications.

COURSE OUTCOME:

❖ Graduates will acquire the knowledge about current technology, trends, designing, developing, implementing, support or management of computer based information systems particularly software applications and computer hardware.

❖ Graduates will able to demonstrate basic knowledge in the areas such as, Software Engineering, Data communication and Networking, Database management, Web Technology and Operating Systems for building IT applications.

❖ Graduates will be able to deploy application software through mini-projects and will inculcate the skills of communication proficiently.

PROGRAMME STRUCTURE

FIRST SEMESTER

SL NO	TITLE OF THE PAPER	CREDIT PATTERN			CREDITS
		L	T	P	
HARD CORE (HC)					
1	Computer Organisation and Architecture	3	1	0	4
2	Problem Solving and Programming in C	2	0	2	4
3	Data Structures and Algorithms	2	0	2	4
4	Discrete Mathematics	3	1	0	4
SOFT CORE (SC)					
5	Web Technologies	2	0	2	4
6	IoT	3	0	1	4
7	E-Commerce	3	1	0	4

SECOND SEMESTER

SL NO	TITLE OF THE PAPER	CREDIT PATTERN			CREDITS
		L	T	P	
HARD CORE					
1	DBMS	2	0	2	4
2	Operating System	3	0	1	4
3	Mobile Computing and its Applications	2	1	1	4
4	Python Programming	2	0	2	4
SOFT CORE					
5	Probability and Statistics	3	1	0	4
6	Computer Graphics	2	0	2	4
7	ERP	3	1	0	4
OPEN ELECTIVE	Web Designing	2	0	2	4

THIRD SEMESTER

SL NO	TITLE OF THE PAPER	CREDIT PATTERN			CREDITS
		L	T	P	
HARD CORE					
1	Cloud Computing	3	1	0	4
2	Object Oriented Programming in JAVA	2	0	2	4
3	Data Communication and Computer Networking	3	0	1	4
4	.NET Technologies	2	0	2	4
SOFT CORE					
5	Artificial Intelligence	3	1	0	4
6	Software Project Management & Documentation	3	1	0	4
7	Cyber Laws & Network Security	3	1	0	4
OPEN ELECTIVE	Multimedia Technologies	2	0	2	4

FOURTH SEMESTER

SL NO	TITLE OF THE PAPER	CREDIT PATTERN			CREDITS
		L	T	P	
HARDCORE					
1	PROJECT	0	2	6	8

DETAILED SYLLABUS FOR
M. Sc IN INFORMATION TECHNOLOGY

FIRST SEMESTER

HARD CORE

COMPUTER ORGANISATION AND ARCHITECTURE

UNIT-1

Basic of computer, Generation of computer, classification of computers, Von Neumann architecture, Micro operations, Register Transfer Micro operations, arithmetic micro operations, logic micro operations, shift micro operations, floating point arithmetic operations.

UNIT-2

Computer registers, computer instructions, register transfers, instruction execution, instruction cycle, instruction format-3 address, two addresses, single address and zero address, addressing modes, data transfer and manipulation, stack organisation, Timing and control, processor bus organisation, input and output devices, central processing unit.

UNIT-3

RISC and CISC machine characteristics, data transfer and manipulation, memory hierarchy ,main memory, cache memory, virtual memory, address space and memory space, associate memory, multi-port memory, interconnection structure time shared common bus, characteristics of multiprocessors.

UNIT-4

types of parallel processor systems, pipelining, clusters, cluster configuration, crossbar switch, mainframe and mini computers, wearable computers, the future of computer architecture, Laptop configuration, i3,i5,i7 processor advantages and disadvantages.

REFERENCE SOURCES:
1. Abd-El-Barr, M., & El-Rewini, H. (2005). *Fundamentals of computer organization and architecture*. Hoboken, NJ: Wiley.

2. Hamacher, V. C., Vranesic, Z. G., & Zaky, S. G. (1978). *Computer organization*. New York: McGraw-Hill Book.
3. Hayes, J. P. (1985). *Computer architecture and organization*. Madrid: MacGraw-Hill.
4. Hennessy, J. L., Asanovic, K., Goldberg, D., & Patterson, D. A. (1989). *Computer architecture: A quantitative approach*. Amsterdam: Morgan Kaufmann.
5. Null, L., & Lobur, J. (2003). *The essentials of computer organization and architecture*: Linda Null, Julia Lobur. Sudbury, MA: Jones and Bartlett.
6. Patterson, D. A., & Hennessy, J. L. (2016). *Computer Organization and Design: The Hardware Software Interface*. Morgan kaufmann.

PROBLEM SOLVING AND PROGRAMMING IN C

UNIT-1

Introduction, History of C, Basic structure of C, compiling a C program, compiler & interpreters. Characteristics of C, Character set of C, Application of C, C-tokens. Constants & variable, Types of constants, Data types: type qualifiers enum, typedef, Operators: unary operator, Binary operator Arithmetic operator, logical operator, relational operator, bitwise operator, conditional / ternary operator, shorthand assignment operator, operator precedence and associativity.

UNIT-2

Control statements: Conditional control statement, if statement, if-else statement, nested if-else, switch case. Unconditional control statement, break statement, continue statements goto statement. Looping / iterative statements, while, do while, for loop, nested for loop. Arrays One dimensional array, array manipulation searching, insertion, deletion, of an element from an array, finding the largest / smallest element in an array, two dimensional array, addition / multiplication of two matrices.

UNIT-3

Pointers, pointer declaration, Structure: definition, types of structure declation , accesing members of structure, array of structure, pointers and structure. Union: definition of union, declaration of union, difference between structure & union, Strings: String handling function, Header files: header files case, ctype.h, math.h, process.h, string.h, time.h namespaces & exceptions. Escape sequences, back slash constants.

UNIT-4

Functions: Introduction to function, types of functions, ANSI function and Non-ANSI function, category of functions, Call by returning value, call by reference. Recursion, storage clases, automatic storage class(auto), register storage class(register), static storage class(static), external storage class(extern). Concept of File: file opening I various mode & closing of a file, reading from a file, wrong onto a file.

REFERENCE SOURCES:
1. Dale, N. (2016). *Programming and problem solving with c*. Sudbury: Jones & Bartlett Learning.
2. Gottfried, B. S. (2011). *Programming with C*. New Delhi: Tata Mcgraw Hill Publishing Company.
3. Hanly, J. R., & Koffman, E. B. (2018). *Problem solving and program design in C*. Upper Saddle River: Pearson.
4. Somashekara, m. T. Guru, d. S. Manjunatha, k. S. (2018). *PROBLEM SOLVING WITH C*. Place of publication not identified: PHI LEARNING.
5. Sprankle, M., & Hubbard, J. (2009). *Problem solving and programming concepts / by Maureen Sprankle, Jim Hubbard*. London: Pearson Education.
6. Yadav, D. S., & Khanna, R. (2020). *Programming for Problem Solving Using C*. New Age International (P) Ltd Publishers

DATA STRUCTURES AND ALGORITHMS

UNIT-1
Introduction to Data Structures, Arrays, Primitive datastructure: Integer, Real, Character, String, Pointer and their representations and operations. Fixed point and floating point representation of real numbers. Introduction to Non primitive data structures. Arrays – one, two and multi dimensional array representation. Pointers-Introduction, Declaring and initializing pointers.

UNIT-2

Stacks: Introduction, operations associated with Stacks, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack, Queues: introduction, types of queues, Operations and Applications, . Tree: Binary tree, Complete binary tree, Heap Tree terminology : Root, Node, Degree of a node and tree, Terminal nodes, Non terminal nodes, Siblings, Level, Edge, Path, depth, Parent node, ancestors of a node Traversal of Binary Tree: Preorder, Inorder and postorder.

UNIT-3

Algorithm, Flowchart, Complexity analysis, Analyzing algorithms, Designing algorithms, divide and conquer, The greedy method, Kruskal's algorithm, „Tower of Hanoi".

UNIT-4

Graphs: Basic Concepts about Graphs, Matrix Representation of Graphs, List Structures, Other Representations of Graphs, Algorithms for Graph Traversal, Spanning Trees.

*REFERENCE SOURCES***:**
1. Aho, A. V., Hopcroft, J. E., & Ullman, J. D. (2009*). Data Structures and algorithms*. Delhi: Dorling Kindersly.
2. Braß, P. (2019). *Advanced data structures*. Cambridge: Cambridge University Press.
3. Cormen, T. H., Leiserson, C. E., Rivest, R. L., & Stein, C. (n.d.). *Introduction to algorithms*.
4. Goodrich, M. T., Tamassia, R., & Mount, D. M. (2011). *Data structures and algorithms in C*. Hoboken: John Wiley & Sons.
5. Karumanchi, N. (2016). *Data structures and algorithms made easy: Data structures and algorithmic puzzles*. Place of publication not identified: CAREERMONK PUBLICATIONS.
6. Lipschutz, S. (2014). *Data structures*. New Delhi: McGraw Hill Education(India) Private Limited.
7. Weiss, M. A. (2004). *Data Structures and Algorithm Analysis in C* 2nd [M].

DISCRETE MATHEMATICS

UNIT-1
Set theory: Sets and Subsets, Operations on sets, Product of sets, Principles of Inclusion and Exclusion, Countable and Uncountable sets, Counting and Venn Diagrams.

Mathematical Logic: Statements and Notations, Connectives and Truth tables, logic equivalence, well formed formulas, Tautologies, Implications, Use of Quantifiers, Qualifiers.

UNIT-2
Fundamental Principles of Counting: Integer properties, Counting Technique, The rules of sum of product, Permutations, Combinations, Fundamental Mathematical Induction, Well ordering principle, Recursive function.

UNIT-3
Relations and Functions: Cartesian Products, Relations, Types of relations, Matrix Relation, Equivalence relations and partitions, Matrices and Directed graphs, Operations on relations.

Types of Functions, One-to-one, Onto functions, Invertible functions, Permutation functions, Pigeonhole principle, Function composition and Inverse Functions.

UNIT-4
Boolean Algebra: Boolean algebra, Uniqueness of finite Boolean algebra, Boolean functions and expressions.

Groups: Definitions and Examples, Homomorphism, Isomorphism, Cyclic Groups, Cosets and Lagrange"s Theorem. Semigroups, Monoid, Generators and Evaluation of powers.

Graphs: Basic Terminology, Multigraphs and weighted graphs, Paths and Circuits, Hamiltonian paths and Circuits. Trees: Rooted Trees, Prefix codes, Binary search Trees, Spanning Trees.

REFERENCE SOURCES:
1. Balakrishnan, V. K. (1996). *Introductory discrete mathematics*. New York: Dover Publications.
2. Bender, E. A., & Williamson, S. G. (2005). *A short course in discrete mathematics*. Mineola (N.Y.): Dover.
3. Epp, S. S. (2019). *Discrete mathematics with applications*. Boston, MA: Cengage Learning.
4. LEVIN, O. (2016). *Discrete Mathematics: An open introduction*. Place of publication not identified: 12TH MEDIA SERVICES.

5. Lewis, H. R., & Zax, R. (2019). *Essential discrete mathematics for computer science*. Princeton, NJ: Princeton university press.

6. Scheinerman, E. R. (2013). *Mathematics: A discrete introduction*. Boston, MA: Brooks/Cole.

7. Wallis, W. D. (2011). *A beginner's guide to discrete mathematics*. Springer Science & Business Media.

SOFTCORE

WEB TECHNOLOGIES

UNIT-1

Web Fundamentals: Internet, WWW, Web Browsers and Web Servers, URLs, MIME, HTTP, Security, the Web Programmers Toolbox. **Introduction to XHTML:** Basic syntax, Standard structure, Basic text markup, Images, Hypertext Links. Lists, Tables, Forms, Frames, Syntactic differences between HTML and XHTML. HTML, HTML Documents, Basic structure of an HTML document, Creating an HTML document, Mark up Tags, Heading-Paragraphs, Line Breaks, HTML Tags. Elements in HTML- Text, Lists, Tables and Frames, Hyperlinks, Images and Multimedia, Forms and controls.

UNIT-2

CSS: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The box model, Background images, The <span> and <div> tags, Conflict resolution. **JavaScript**: Overview of JavaScript, Object orientation and JavaScript, general Syntactic characteristics, Primitives, operations, and expressions, Screen output and keyboard input, Control statements, Object creation and modification, Arrays, Functions, Constructors, Pattern matching using regular expressions, Errors in scripts.

UNIT-3

JavaScript and XHTML Documents : The JavaScript Execution Environment, The Document Object Model, Elements Access in Java Script, Events and Event Handling, Handling Events from Body Elements, Handling Events from Text Box and password Elements, The DOM2 Model, The navigator Object, Dom Tree Traversal and Modification.

Dynamic Documents with JavaScript : Introduction, Positioning Elements, Moving Elements, Element Visibility, Changing Colors and Fonts, Dynamic Content, Stacking Elements, Locating the Mouse Cursor, Reacting to a Mouse Click, Slow Movement of Elements, Dragging and Dropping Elements.

UNIT-4

XML: Introduction, Syntax of XML, XML Document Structure, Document type definitions, Namespaces, XML schemas, displaying raw XML documents, Displaying XML documents with CSS, Web services. Working with XML DOM in Ajax Building XML and working with XML in JavaScript, Rich Internet Applications With Ajax: Limitations of Classic Web application model, AJAX principles, Technologies behind AJAX, Examples of usage of AJAX; Asynchronous communication and AJAX application model.

REFERENCE SOURCES:
1. Anders, M. (2009). *An introduction to XML and Web technologies*. Pearson Education India.
2. Barolli, L., Xhafa, F., Khan, Z. A., & Odhabi, H. (Eds.). (2019). *Advances in Internet, Data and Web Technologies: The 7th International Conference on Emerging Internet, Data and Web Technologies (EIDWT-2019)* (Vol. 29). Springer.
3. Deitel, P., & Deitel, H. (2007). *Internet & world wide web: how to program*. Prentice Hall Press.
4. Gopalan, N. P., & ADIKESAVAN, T. (2014). *Web Technology: A Developer's Perspective*. PHI Learning Pvt. Ltd..
5. Jackson, J. C. (2006). *Web Technologies*. Pearson India.
6. Kumar, A. (2018). *Web Technology: Theory and Practice*. CRC Press.
7. Nolan, D., & Lang, D. T. (2014). *XML and web technologies for data sciences with R* (Vol. 1). New York: Springer.
8. Ray, E. T. (2003). *Learning XML: creating self-describing data*. " O'Reilly Media, Inc.".
9. Roy, U. K. (2010). *Web Technologies*. Oxford University Press.
10. Scobey, P., & Lingras, P. (2016). *Web Programming and Internet Technologies: An E-commerce Approach*. Jones & Bartlett Learning.

IoT (INTERNET OF THINGS)

UNIT-I

Introduction & Concepts: Introduction to Internet of Things, Definitions and Characteristics of IoT, Physical Design of IoT, Things in IoT, IoT Protocols, Logical Design of IoT, IoT

Functional Blocks, IoT Communication Models, IoT Communication APIs, IoT Enabling Technologies, Wireless Sensor Networks, Cloud Computing, Big Data Analytics, Communication Protocols, Embedded Systems, IoT levels and Development Templates, IoT Level-1, IoT Level-2, IoT Level-3, IoT Level-4, IoT Level-5, IoT Level-6.

UNIT-2

IoT Platform Design Methodology: Introduction, IoT Design Methodology: Step1: Purpose and requirement specification, Step2: Process Specification, Step 3: Domain Model Specification, Step 4: Information Model Specification, Step 5: Service Specification, Step 6: IoT Level Specification, Step 7: Function View Specification Step 9: Device and Component Integration, Step 10: Application Development. Case Study: Weather Monitoring.

UNIT-3
Python Programming: Introduction, Installing Python, Python Data Types and Data Structures, Control Flow, Functions, Modules, Packages, File Handling, Date Time applications, Classes, Python Packages of Interest for IoT.

Python web application frame work-django, designing a RESTful web API, amazon web services for IoT, SkyNetIoT messaging platforms.

UNIT- 4
Raspberry Pi : Basic Building Blocks - The Board, Linux on Raspberry Pi, Raspberry pi interfaces, programming Raspberry Pi with python.

Cloud: IoT physical servers and cloud offerings: introduction to cloud storage models and communication Networks.

REFERENCE SOURCES:

1. Alam, M., Shakil, K. A., & Khan, S. Internet of Things (IoT).
2. Bahga, A., & Madisetti, V. (2014). *Internet of Things: A hands-on approach*. Vpt.
3. McEwen, A., & Cassimally, H. (2013). *Designing the internet of things*. John Wiley & Sons.
4. Raj, P., & Raman, A. C. (2017). *The Internet of Things: Enabling technologies, platforms, and use cases*. CRC Press.
5. *The Internet of Things: From Data to Insight, Editors: John Davis, Carolina Fortuna: 11 February 2020.*

E-COMMERCE

UNIT-1

Introduction to E-commerce, Evolution of E-commerce: History of E-commerce, Advantages and Disadvantage of E-commerce, E-commerce Infrastructure: Hardware, Software, Network, Website. Managing the e-Enterprise: E-business Enterprise, Comparison between Conventional Design and E-organisation, Organisation of Business in an e-Enterprise.

UNIT-2

E-Commerce Process Models: Business Models, E-business Models Based on the Relationship of Transaction Parties, e-commerce Sales Life Cycle (ESLC) Model. The Life Cycle of Site Building-From Page to Stage, Building a Web Site, E-Commerce B2B Models and B2B Tools. Electronic Data Interchange (EDI): Meaning of EDI, History of EDI, EDI Working Concept, Implementation difficulties of EDI, Financial EDI, EDI and Internet.

UNIT-3

E-Marketing: B2C and B2B Marketing, Branding Strategies, Advertising, E-Commerce Retailing & Services, Social Networking, Communities, & Actions.

Marketing on the Internet: Online Shopping, Internet Marketing Techniques. The E-Cycle of Internet Marketing, Attracting customers to your site.

Electronic Payment Systems, Requirements for Internet-Based Payments, Electronic Payment Media -Electronic Cash, Credit cards, Debit cards and Smart Cards,

UNIT-4

Electronic Payment Systems: Risks associated with Internet and Transactions, Management of Risk: Disaster Recovery Plans, Risk Management Paradigm. Security in cyberspace, designing for security, Virus: Security Protection and Recovery. Digital Signature.

Future Directions: Software Agents. E-Commerce & Ethics. Roadmap of e-commerce in India.

REFERENCE SOURCES:

1. Bhatia, V. (2000). E-Commerce (Includes E-Business). *New Delhi: Khanna Book.*
2. Gupta, M. P. (2004). Promise of e-Governance: operational challenges.
3. Kalakota, R., & Whinston, A. B. (1997). *Electronic commerce: a manager's guide.* Addison-Wesley Professional.
4. Laudon, K. C., & Traver, C. G. (2016). *E-commerce: business, technology, society.*

5. Lee, J. K., Liang, T. P., Turban, D. C., Turban, E., & King, D. (2015). Electronic Commerce: A Managerial and Social Networks Perspective.

6. Minoli, D., & Minoli, E. (1997). *Web commerce technology handbook*. McGraw-Hill School Education Group.

7. Rosenborg, V. (2005). *PayPal for dummies*. Wiley.

8. Whiteley, D. (2000). *E-commerce: strategy, technologies and applications*. McGraw-Hill Publishing Company.

SECOND SEMESTER

HARD CORE

DBMS

UNIT-1

Introduction to database management system, purpose of database management system, view of data, relational databases, database architecture, transaction management, Advantages of DBMS, Data Models, Database System Architecture, Relational Database Management systems. ER-Diagrams, ERD Issues, weak entity sets, Codd's rules, Entities, Attributes and Entity Sets.

UNIT-2

SQL commands, Data Definition Language Commands, Data Manipulation Language Commands, Data types, modifying the structure of the table. Viewing the Data, Computations on Table Data, Arithmetic Operators; Logical Operators, Comparison Operators, Aggregate operator and Oracle functions. Integrity constraints, Enforcing Data Integrity, Introduction to views.

UNIT-3

Joins: Equi Joins, Non Equi Joins, Self Joins, Outer Joins. Using Set Operators- Union, Intersect; Minus. Views-Definition, Advantages Views, Creating and Altering Views, Using Views, Indexes-Definition and Advantages of Indexes. Database Objects: Sequences, Creating Sequences; Referencing Sequences; Altering a Sequence; Dropping a Sequence.

UNIT-4

Normalization (1NF, 2NF, 3NF, BCNF).Introduction to PL/SQL.: Advantage of PL/SQL; The Generic PL/SQL Block; The Declaration Section; The Begin Section; The End Section; PL/SQL Data types.

REFERENCE SOURCES:
1. Date, C. J. (1975). *An introduction to database systems*. Reading (MA): Addison-Wesley.
2. Date, C. J. (2015). *SQL and relational theory: How to write accurate SQL code*. Sebastopol, CA: OReilly Media.
3. Elmasri, R., & Navathe, S. (2017). *Fundamentals of database systems*. Boston: Pearson.
4.   Groff, J. R., & Weinberg, P. N. (1999). *SQL: The complete reference*. Berkeley: Osborne/McGraw-Hill.
5. Kreines, D. C. (2000). *Oracle SQL: The essential reference*. Sebastopol, CA: OReilly and Associates.
6. Mata-Toledo, R. A. (n.d.). *Schaums Outline of Fundamentals of Relational Databases*. Adobe Systems.
7. Ramakrishnan, R., & Gehrke, J. (2000). *Database management systems*. Boston: McGraw-Hill.
8. Shah, N. (2009). *Database systems using oracle: A simplified guide to SQL and PL/SQL*. New Delhi: PHI Learning Private.
9. Technology, C. (2015). SQL QuickStart Guide*: The Simplified Beginners Guide to SQL*. Albany NY: Createspace Independent Publishing Platform.

OPERATING SYSTEM

UNIT-1

Overview of operating systems, functionalities and characteristics of OS, hardware concepts related to OS, memory hierarchy, micro programming, operations on processes, process states, concurrent processes, process control block, process context, distributed and modern operating system, operating system design and implementation.

UNIT-2

Job and processor scheduling, scheduling algorithm, process hierarchies, Mutual exclusion, process co-operation, producer and consumer processes, operating system services, real time, user operating system, system calls, types of system calls, system programs, operations on processes.

UNIT-3

Process and process synchronisation, process concept, process scheduling, scheduling criteria, scheduling algorithm, Thread scheduling, communication in client –server system, semaphores definition, init, wait, signal operations, implementation of semaphores.

UNIT-4

Operating system structure, virtual machine, operating system generation, system boot, memory management without swapping or paging, virtual memory, page replacement algorithm, modelling paging, design issues for paging systems.

REFERENCE SOURCES:
1. "Modern Operating Systems"- Andrew S. Tanenbaum**: 1992.**
2. "Operating System Concepts"- Avi Silberschatz, Greg Gagne, and Peter Baer Galvin**: 17 December 2012.**
3. "Operating System Concepts"- Avi Silberschatz, Greg Gagne, and Peter Baer Galvin**: September 2016.**
4. "Operating Systems: A Concept-based Approach"- D. M. Dhamdhere: 2003.
5. "Operating Systems: Internals and Design Principles"- William Stallings: 1992.
6. "The Design of the UNIX Operating System"- Maurice J. Bach**: 1986.**
7. "The Linux Programming Interface"- Michael Kerrisk**: 2010.**

MOBILE COMPUTING AND ITS APPLICATIONS

UNIT-1

Introduction: Current Wireless Systems: Overview of Paging Systems, Cordless Phones, Cellular Telephone Systems, Satellite Communication, Wireless LANs, Blue tooth. Medium access control, Telecommunication Systems – SDMA, TDMA, CDMA, GSM.

UNIT-2

Mobile computing through Internet- Mobile-enabled Applications, Mobile Applications – Multichannel and Multi modal user interfaces – Synchronization and replication of Mobile Data - SMS architecture, GPRS – Mobile Computing through Telephony - Synchronization protocol.

UNIT-3

Wireless LAN – IEEE 802.11 – Infrared vs Radio Transmission, Infrastructure Networks, Ad-hoc Networks, Bluetooth Wireless ATM, Radio Access Layer, Handover, Location Management, Addressing Mobile Quality of Service, Access Point, Control Protocol.Mobile Communication: Wireless Transmission – Medium Access Control – Telecommunication Systems – Satellite Systems – Broadcast system – Wireless LAN.

UNIT-4

MAC protocol – Routing protocols - Transport Layer Protocol - QOS – Energy Management. Overview of Cellular IP – Options of Cellular IP – Key, Mechanism in Cellular IP – route Optimization. Overview of TCP/IP – Structure of TCP/IP. Advert-Hoc Primary Ideas – Traits Purposes.

*REFERENCE SOURCES***:**

1. Adelstein, F., Gupta, S. K., Richard, G., & Schwiebert, L. (2005). *Fundamentals of mobile and pervasive computing* (Vol. 1). New York: McGraw-Hill.

2. Burkhardt, J., Schaeck, T., Henn, H., Hepper, S., & Rindtorff, K. (2001). *Pervasive computing: technology and architecture of mobile Internet applications*. Addison-Wesley Longman Publishing Co., Inc.

3. Karahoca, A. (Ed.). (2012). Advances and Applications in Mobile Computing. BoD–Books on Demand.

4. Pattnaik, P. K., & Mall, R. (2015). *Fundamentals of Mobile Computing*. PHI Learning Pvt. Ltd..

5. Talukdar, A. K. (2010). *Mobile Computing, 2E*. Tata McGraw-Hill Education.

PYTHON PROGRAMMING

UNIT-1

Introduction: What is a Program, The Python Programming Language, History, features, Installing Python, Running a Python program, the first program, Arithmetic operators, Variables, datatypes and Operators. Conditional Statements, Looping, String Manipulation.

UNIT-2

Lists- Introduction, Accessing list, Operations, Working with lists, Function and Methods. Tuple- Introduction, Accessing tuples, Operations. Dictionaries, Regular Expressions.

UNIT-3

Input-Output- Printing on screen, Reading data from keyboard, Opening and closing file, Reading and writing files. Functions- Defining a function, Calling a function, Types of functions.

UNIT-4

Classes and objects, Classes and functions, Classes and methods.

*REFERENCE SOURCES***:**

1. Ascher, D., & Lutz, M. (1999). *Learning Python*. O'Reilly.
2. Beazley, D. M. (2009). *Python essential reference*. Addison-Wesley Professional.
3. Brown, F., & George, P. (2001). Python: the complete reference. *Brown: 2001*.
4. Chun, W. (2001). *Core python programming* (Vol. 1). Prentice Hall Professional.
5. Lutz, M. (2014). *Python Pocket Reference: Python In Your Pocket*. " O'Reilly Media, Inc.".
6. Van Rossum, G., & Drake, F. L. (2011). *The python language reference manual*. Network Theory Ltd..

<u>SOFTCORE</u>

PROBABILITY STATISTICS

UNIT - 1

Probability: Basic concept and definition of probability, probability axioms, Laws of Probability, Conditional probability, Bayes theorem, Problems and application. Random variable and Expectation: Discrete and continuous random variables, expectation of random variables, theorems on expectation, Illustrative examples.

UNIT - 2

Probability Distribution: Probability function, Probability mass/density function, Discrete Distribution – Bernoulli, Binomial, Geometric, Poisson, Uniform, Continuous distribution – Exponential, Normal, Uniform, Applications and problems.

UNIT – 3

Sampling distributions-Mean, Variance, Estimation-Point estimation of mean and variance, Interval estimation of mean and variance, Sample size estimation, Bayesian estimation, Hypothesis testing-One mean, One variance, Two mean tests, Ratio of variances.

UNIT -4

Correlation, Scatter diagram, Karl Person"s correlation coefficients, Probable error for Correlation coefficients, Rank correlation, Regression- regression lines, regression coefficients, properties of regression coefficients, fitting of regression lines, curvilinear regression.

REFERENCES SOURCES:

1. Jusgir S Trivedi, "Probability and Statistics with Reliability, Queuing and Computor Applications", Prentis Hall of India, 2000.
2. Papoulis and S. Unnikrishna Pillai, "Probability, Random Variables and Stochastic Processes, McGraw Hill, 4th Edition.
3. Probability and Statistics for Engineers - G.S.S. Bhishma Rao.
4. Probability and Statistics with applications to Computer Science- K. S. Trivedi.
5. Richard A Johnson, Probability and Statistics for Engineers Prentice Hall, India 2002.

COMPUTER GRAPHICS

UNIT-1

Introduction Computer Graphics and Primitive Algorithms: Introduction to Image and Objects, Image Representation, Basic Graphics Pipeline, Bitmap and Vector-Based Graphics, Applications of Computer Graphics, Display Devices, Cathode Ray Tubes, Raster-Scan Display, Random-Scan Display, Flat Panel Display, Input Technology, Coordinate System Overview, Scan-Conversion of graphics primitives: Scan-Conversion of a Lines (Digital Differential Analyzer Algorithm, Bresenham's LineDrawing Algorithm, Scan-Conversion of Circle and Ellipse (Bresenham's Method of Circle Drawing, Midpoint Circle Algorithm), Drawing Ellipses and Other Conics.

UNIT-2

Two Dimensional Transformation: Introduction to transformations, Transformation Matrix, Types of Transformations in Two-Dimensional Graphics: Identity Transformation, Scaling, Reflection, Shear Transformations, Rotation, Translation, Rotation about an Arbitrary Point, Combined Transformation, Homogeneous Coordinates, 2D Transformations using Homogeneous Coordinates.

UNIT-3

Three-dimensional transformations, Objects in Homogeneous Coordinates; Three-Dimensional Transformations: Scaling, Translation, Rotation, Shear Transformations, Reflection, World Coordinates and Viewing Coordinates, Projection, Parallel Projection, Perspective Projection.

UNIT-4

Viewing and Solid Area Scan-Conversion: Introduction to viewing and clipping, viewing Transformation in Two Dimensions, Introduction to Clipping, Two-Dimensional Clipping, Point Clipping, Line Clipping, Introduction to a Polygon Clipping, Viewing and Clipping in Three Dimensions, Three-Dimensional Viewing Transformations, Text Clipping. Introduction to Solid Area Scan-Conversion, Inside - Outside Test, Winding Number Method and Coherence Property, Polygon Filling, Seed Fill Algorithm, Scan-Lino Algorithm, Priority Algorithm, Scan Conversion of Character, Aliasing, Anti-Aliasing, Halftoning, Thresholding and Dithering.

REFERENCE SOURCES:
1. Angel, E., & Shreiner, D. (2012). Interactive computer graphics: a top-down approach with shader-based OpenGL. Boston: Addison-Wesley.
2. Desai, A. A. (2008). Computer graphics. Place of publication not identified: Phi Learning.
3. Marschner, S., & Shirley, P. (2018). Fundamentals of computer graphics. Place of publication not identified: A K Peters/CRC Press.
4. Masson, T. (1999). CG 101: A computer graphics industry reference. Indianapolis: New Riders.
5. Rogers, D. F., & Adams, J. (1990). Mathematical elements for computer graphics. New York: McGraw-Hill.

ERP - ENTERPRISE RESOURCE PLANNING

UNIT-1

Introduction – Related Technologies – Business Intelligence – E-Commerce and EBusiness– Business Process Reengineering, E-Commerce and EBusiness, Implementation Challenges – Strategies – Life Cycle – Pre-implementation Tasks – Requirements Definition- Methodologies – Package selection – Project Teams –Process Definitions – Vendors and Consultants – Data Migration – Project management– Post Implementation Activities. Role of ERP in Purchasing, Purchase Module: Features of purchase module; Benefits of purchase module, ERP Purchase System.

UNIT-2

Finance, Sales and Distribution, Manufacturing and Production Planning- Material and Capacity Planning; Shop Floor Control; Quality Management; JIT/Repetitive Manufacturing; Cost Management ; Engineering Data Management; Engineering Change Control, Configuration Management, Role of ERP in Finance, Accounting and Finance Processes: Cash management; Capital budgeting, Features of ERP Financial Module, Benefits of ERP Financial Module.

UNIT-3

ERP IN ACTION & BUSINESS MODULES: Operation and Maintenance – Performance – Maximizing the ERP. Quality Management - Functions of Quality Management; CAQ and CIQ; Materials Management- Pre-purchasing; Purchasing; Vendor Evaluation; Inventory Management and Invoice Verification and Material Inspection.

UNIT-4

ERP MARKET: Marketplace – Dynamics – SAP AG – Oracle – PeopleSoft – JD Edwards – QAD Inc , SSA Global – Lawson Software – Epicor – Intutive. New Trends in ERP, ERP to ERP II-Implementation of Organisation-Wide ERP, Development of New Markets and Channels, Latest ERP Implementation Methodologies, ERP and E-business, Market Snapshot, The SOA Factor.

REFERENCE SOURCES:
1. Bradford, M. (2014). *Modern ERP: select, implement, and use today's advanced business systems*. Lulu. com.
2. Leon, A. (2008). *ERP demystified*. Tata McGraw-Hill Education.
3. Leon, A. (2014). *Enterprise resource planning*. McGraw-Hill Education.
4. Monk, E., & Wagner, B. (2012). *Concepts in enterprise resource planning*. Cengage Learning.

5. Shields, M. G. (2004). *E-business and ERP: Rapid implementation and project planning*. John Wiley & Sons.

OPEN ELECTIVE: WEB DESIGNING

UNIT-1

Introduction, Brief History of Internet, Web Standards. Introduction to HTML, HTML Document, Basic structure of an HTML document, Creating an HTML document, Mark up Tags, Heading-Paragraphs, Line Breaks, HTML Tags. Internet Principles – Basic Web Concepts–Client/Server model – Retrieving data from Internet – Scripting Languages – Perl Programming – Next Generation Internet – Protocols and applications. Tables & Lists – Creating Tables and Lists in HTML documents.

UNIT- 2

Creation of animated GIF, Sizing the pictures, Adding external images, video, and sound file including device independent (DVI) files. Add marquees of scrolling text. Frames Setting, releasing frames. Using one frame to index another. Creating floating frames, borderless frames and frames with borders. Links: Creating links to local range, other pages, specific part of page, electronic mail. Forms in HTML, Adding text box, check box, radio buttons, pulldown menus, single-line text field and password field, Processing the forms.

UNIT-3

Creating style sheets to other HTML element, altering different characteristics and features. Fundamentals of Web, Internet, WWW, Web Browsers and Web Servers, URLs, MIME, HTTP, Security, The Web Programmers Toolbox., CSS: Lists, Tables, Forms, Frames CSS: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, the box model, Background images.

UNIT-4

XML: Introduction, Syntax, Document structure, Document type definitions, Namespaces, XML schemas, displaying raw XML documents, XML processors, Web services. PHP: Origins and uses of PHP, Overview of PHP, General syntactic characteristics, Primitives, operations and expressions, Output, Control statements, Arrays, Functions, Pattern matching, Form handling, Files, Cookies, Session tracking.

REFERENCE SOURCES:
1. HTML Programmers Reference: Thomas A Powell / Dan Whitworth.
2. HTML 4 For Dummies: Ed Tittel / Mary Burmeister

3. HTML &Amp; Java Script Programming Concepts, By Shane Turner E / Karl Barksdale
4. HTML Introduction to Web Page Design &Amp; Development schaum Outline Series: David Mercer.
5. HTML &Amp; XML An Introduction:NIIT.
6. HTML &Amp; Javascript For Visual Learners, Chris Charuhas , ISBN : 81-7008-359-1 , Edition:2008.
7. Magic With HTML, DHTML &Amp; Javascript, Dr. Ravinder Singh Amit Gupta ISBN : 978-81-318-0765-1, Edition : First, 200
8. HTML, XHTML, CSS And XML By Example A Practical Guide, Teodoru Gugoiu ISBN : 81-7008-804-6, Edition : 2007.
9. Internet And Its Applications With HTML &Amp; VB-Script ,Prof. Shashi Banzal
10. ISBN: 978-81-908565-6-0, Edition: First, 2009.
11. Multimedia Applications and Web Designing ,Dinesh Maidasani ISBN: 978-81-318-0440-7,Edition: First, 2008.

THIRD SEMESTER

HARD CORE

CLOUD COMPUTING

UNIT-1

Cloud Computing definition, private, public and hybrid cloud. Cloud types: IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, role of virtualization in enabling the cloud; Business Agility: Benefits and challenges to Cloud architecture. Application availability, performance, security and disaster recovery, next generation Cloud Applications.

UNIT-2

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.

UNIT-3

Technologies and the processes required when deploying web services; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages.

UNIT-4

Analysis of Case Studies when deciding to adopt cloud computing architecture. How to decide if the cloud is right for your requirements. Cloud based service.

*REFERENCE SOURCES***:**

1. Velte, T., Velte, A., & Elsenpeter, R. (2009). *Cloud computing, a practical approach.* McGraw-Hill, Inc..

2. Miller, M. (2008). *Cloud computing: Web-based applications that change the way you work and collaborate online.* Que publishing.

3. Beard, H. (2008). *Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data centers in the Cloud with SLAs.* Emereo Pty Ltd.

4. Polze, A. (2009). A comparative analysis of cloud computing environments. *Hasso-Plattner-Institute for Software Engineering, Tech. Rep*.

5. Talukder, A. K., & Zimmerman, L. (2010). Cloud economics: Principles, costs, and benefits. In *Cloud computing* (pp. 343-360). Springer, London.

OBJECT ORIENTED PROGRAMMING WITH JAVA

UNIT-1

A Review of structures, Procedure–Oriented Programming system, Object Oriented Programming System, Comparison of Object Oriented Language with C, Introduction to Java: Java Architecture and Features, Compiling and Executing a Java Program, Variables, Constants, Keywords Data Types, Operators and Expressions, Decision Making Constructs and Nesting, Java Methods. Arrays, Strings and I/O: Creating & Using Arrays, Referencing Arrays Dynamically.

UNIT- 2

Principles of Object-Oriented Programming, Defining & Using Classes, Controlling Access to Class. Members, Class Constructors, Method Overloading, Class Variables & Methods, Objects as parameters, final classes, Object class, Garbage Collection.
Inheritance: Single Level and Multilevel, Method Overriding, Abstract Classes, Interfaces and Packages, Extending interfaces and packages, Package and Class Visibility.

UNIT-3

Exception Handling - Exception types, uncaught exceptions, throw, built-in exceptions, Creating your own exceptions; Multi-threading: The Thread class and Runnable interface, creating single and multiple threads.

UNIT- 4

Java Applets: Introduction to Applets, Writing Java Applets, Working with Graphics, Incorporating Images & Sounds. Event Handling Mechanisms, Listener Interfaces, Adapter and Inner Classes. The design and Implementation of GUIs using the AWT controls, Swing components of Java Foundation Classes such as labels, buttons, text fields, layout managers, menus, events and listeners; Graphic objects for drawing figures such as lines, rectangles, ovals, using different fonts.

REFERENCE SOURCES:
1. "Java Programming Fundamentals: Problem Solving Through Object Oriented Analysis and Design"- Premchand S. Nair: 2008.
2. "Java: A Beginner's Guide"- Herbert Schildt: 2002.
3. "Java: The Complete Reference"- Herbert Schildt: 1997.
4. "Learning Java by Building Android Games: Learn Java and Android from Scratch by Building Six Exciting Games, 2nd Edition"- John Horton: 29 August 2018.
5. "Object-Oriented Programming and Java"- Danny C. C. Poo, Derek Beng Kee Kiong, and Swarnalatha Ashok: September 1998.
6. "OBJECT-ORIENTED PROGRAMMING WITH C++ AND JAVA"- D. Samanta: October 2004.
7. "Understanding Object-oriented Programming with Java"- Timothy Budd: 1998.
8. C. Thomas Wu(1998). An introduction to programming

DATA COMMUNICATION AND COMPUTER NETWORKING

UNIT-1

Introduction: Data Communications, Networks, The Internet, Protocols and Standards, Network Models, Layered Tasks, The OSI Model, Layers in the OSI Model, TCP/IP Protocol Suite, Addressing, Physical Layer and Media, Data and Signals, Analog and Digital, Periodic Analog Signals, Digital Signals, Transmission impairment, Data Rate Limits, Performance, Digital Transmission, Digital-to-Digital Conversion, Analog-to-Digital Conversion, Analog Transmission, Digital-to-analog Conversion, Analog-to-analog Conversion.

UNIT-2

Bandwidth utilization: Multiplexing and Spreading, Multiplexing, Spread Spectrum, Network Topologies: Bus, Star, Ring, Tree and Mesh topologies. Wired Transmission Media, Magnetic Media, Twisted Pairs, Coaxial Cable, Power Lines, Fiber Optics, Wireless Transmission Media, Radio Frequencies, Microwave Frequencies, Infrared Waves. Network technologies: Local Area Network Technologies, Ethernet Technologies, Ethernet Versions, Token Ring Technologies, Wide Area Network Technologies.

UNIT-3

Error Detection and Correction, Introduction, Block Coding, Liner Block Codes, Cyclic Codes, Checksum, Data Link Control, Framing, Flow and Error Control, Protocols, Noiseless Channels. Network Layer: Logical Addressing, IPv4 Addresses, IPv6 Addresses, Network Layer: Internet Protocol, Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6, Network Layer: Address Mapping, Error Reporting and Multicasting, Address Mapping, ICMP, IGMP, ICMPv6.

UNIT-4

Multiple Access Protocols: CSMA/CA,CSMA/CD, Switching, Circuit-Switched Networks, Datagram Networks, Virtual-Circuit Networks, Structure of a Switch, Transport Layer: Process-Process Delivery: UDP, TCP and SCTP, Process-to-Process Delivery, User Datagram Protocol (UDP),Domain Name System, Electronic mail, FTP,WWW and HTTP, Network Security, Satellite Communication.

REFERENCE SOURCES:

1. Beasley, J. S., & Nilkaew, P. (2012). *Networking essentials*. Indianapolis Ind.: Pearson.
2. Forouzan, B. A. (2013). *Data communications and networking*. New York, NY: McGraw-Hill.
3. Moussavi, M. (2011). *Data Communication and Networking: A Practical Approach*. Cengage Learning.
4. Sharma, *S (2015). Data Communication* and Computer *Networks*. S.K. Kataria & Sons; First Edition.
5. Stallings, W. (2006). *Computer Networking With Internet Protocols and Technology*. Beijing: Publishing House of Electronics Industry.

6. Tomsai, W. (2007*). Introduction to data communication and networking* (1st ed.). Place of publication not identified: New Central Book Agency.
7. White, C. M. (2011*). Fundamentals of Networking and Data Communications*. Course technology Cengage learning.

.NET TECHNOLOGIES

UNIT-1

INTRODUCTION: Introducing C#, Understanding .NET, overview of C#, Literals, Variables, Data Types, Operators, checked and unchecked operators, Expressions, Branching, Looping, Methods, implicit and explicit casting, Constant, Arrays, Array Class, Array List, String, String Builder, Structure, Enumerations.

UNIT-2

OBJECT ORIENTED ASPECTS OF C#: Class, Objects, Constructors and its types, inheritance, properties, indexers, index overloading, polymorphism, sealed class and methods, interface, abstract class, abstract and interface, operator overloading, delegates, events, errors and exception, Threading.

UNIT-3

APPLICATION DEVELOPMENT ON .NET: Building windows application, Creating our own window forms with events and controls, menu creation, accessing data with ADO.NET.

UNIT-4

WEB BASED APPLICATION DEVELOPMENT ON .NET: Programming web application with web forms, ASP.NET introduction, working with XML and .NET, Creating Virtual Directory and Web Application, session management techniques, web.config, web services, passing datasets, returning datasets from web services, handling transaction, handling exceptions, returning exceptions from SQL Server.

REFERENCE SOURCES:

1. Arora, L. & Gupta, A (2013). Net Framework with C# Programming.
2. Balagurusamy, E. (2010). *Programming in C#: A Primer*. McGraw-Hill Education.
3. Michaelis, M., & Lippert, E. (2015). *Essential C# 6.0*. Addison-Wesley Professional.
4. Nagel, C. (2016). *Professional C# 6 and. Net Core 1.0*. John Wiley & Sons.
5. Schildt, H. (2012). *C# : the complete reference*. Tata McGraw-Hill Education.
6. Sharp, J., & Jagger, J. (2002). *Microsoft Visual C# Step by Step*. Microsoft press.

7. Stellman, A., & Greene, J. (2010). *Head first C*. " O'Reilly Media, Inc.".
8. Troelsen, A. W., & Olsen, A. (2012). *Pro C# 5.0 and the. NET 4.5 Framework* (Vol. 6). New York City, USA: Apress.

SOFTCORE

ARTIFICIAL INTELLIGENCE

UNIT-1

Introduction: What is intelligence? History of AI, Basics of AI, Artificial Intelligence Problems, Artificial Intelligence Techniques, Applications of AI. Problem Spaces and Search: Defining the problem as a state space search, Production systems, Problem characteristics, Production system characteristics, Issues in designing search problems, Breadth first search (BFS), Depth first search (DFS), Bi-directional Search.

UNIT-2

Heuristic Search Techniques and Knowledge Representation - Heuristic search algorithms- Generate and Test, Hill climbing, Beam search, Best first, A*, AO*, Simulated Annealing, Constraint satisfaction, Means-Ends analysis. Knowledge Representation (KR): Approaches in knowledge Representation; Knowledge Representation Issues – attributes, relationship, granularity; KR schemes – relational, inheritable, inferential, declarative, and procedural. Overview of Knowledge Representational Structures: Weak Slot and Filler Structures: Semantic Nets, Frames. Strong Slot and Filler Structure: Conceptual Dependency, Scripts.

UNIT-3

Predicate Logic and reasoning- Predicates, variables, quantifiers; Computable functions and predicates; Backward chaining, Normal Forms in Predicate Logic and Clausal Forms; Resolution; Approaches to other reasoning – Probabilistic, Fuzzy, Non monotonic; Non monotonic reasoning- Default reasoning, Minimalist reasoning; Probabilistic reasoning- Bayesian networks, Dempster-Shafer theory, Rule-based systems and Certainty factors; Fuzzy sets and logic.

UNIT-4

Game Playing, Planning and Expert Systems - Definition of Game, Game theory, Relevance of Game theory and Game plying, Min-max Search Procedure, adding Alpha-Beta Cut Offs, stochastic Games, Planning-Goal Stack planning, Hierarchical planning, Nonlinear planning; Expert Systems, Explanation Based Learning(EBL): General approach, EBL architecture, EBL system, Generalization problem, Explanation structure.

REFERENCE SOURCES:

1. Charniak, E. (1985). *Introduction to artificial intelligence*. Pearson Education India.
2. Nilson, N. J. (2002). Artificial Intelligence: A New Synthesis.
3. Owen, T. (1988). Artificial Intelligence by Patrick Henry Winston Addison-Wesley Publishing Company, Massachusetts, USA.
4. Padhy, N. P. (2005). *Artificial intelligence and intelligent systems*. Oxford University Press.
5. Patterson, D. W. (1990). *Introduction to artificial intelligence and expert systems*. Prentice-hall of India.
6. Rich, E., Knight, K., & Nair, S. B. (2009). Artificial intelligence. New Dehli.

SOFTWARE PROJECT MANAGEMENT AND DOCUMENTATION

UNIT-1

Introduction: Project, Program, and portfolio, Operation management, Product life cycle, Project life cycle, project management life cycle. 10-Knowledge areas. Role of project manager and PMO, 10 – Project Knowledge areas with their associated processes. (Ref. 6 PMBOK)

Contract Management – Activities Covered By Software Project Management – Overview of Project Planning – Stepwise Project Planning. Project evaluation: Strategic Assessment – Technical Assessment – Cost Benefit Analysis –Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation, ACTIVITY PLANNING: Objectives – Project Schedule – Sequencing and Scheduling Activities.

UNIT-2

Network Planning Models – Risk Management, , Managing people and organizing teams: Introduction – Understanding Behavior – Organizational Behavior: A Background –Selecting the Right Person for the Job – Instruction In The Best Methods Motivation– The Oldman –

Hackman Job Characteristics Model – Working In Groups – Becoming A Team –Decision Making – Leadership – Organizational Structures – Stress –Health And Safety – Case Studies.

UNIT-3

Monitoring and control-Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring –Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

UNIT-4

Software Communication: The Seven Cs of Effective Communication- Completeness, Conciseness, Consideration, Concreteness, Clarity, Courtesy, Correctness Communication: Its interpretation, Basics, Nonverbal Communication, Barriers to Communication, Business Communication at Work Place: Letter Components and Layout, Planning a letter, Process of Letter, writing, E-mail Communication, Memo and Memo reports, Employment Communication, Notice agenda and Minutes of meeting, Brochures, Reports and Types of Business Reports- Required Skills: Reading and writing, listening, note-making, précis, audiovisual aids, oral communication, Mechanics of Writing, Transitions, Spelling rules, hyphenation, transcribing numbers, Abbreviating technical and non-technical terms, Proof reading.

REFERENCE SOURCES:
1. Jalote, P. (2005). *Software project management in practice*.
2. Luckey, T., & Phillips, J. (2011). *Software project management for dummies*. Hoboken, NJ: For Dummies.
3. Hughes, R., & Cotterell, M. (2002). *Software project management*. London: McGraw-Hill.
4. Wysocki, R. K. (2006). *Effective software project management*. Indianapolis, IN: Wiley Pub.
5. Futrell, R. T., Shafer, D. F., Shafer, L. I., Shafer, L. I., & Shafer, L. I. (2002). *Quality software project management*. Upper Saddle River, NJ: Prentice Hall.
6. Chemuturi, M., & Cagley, T. M. (2010). *Mastering software project management: Best practices, tools and techniques*. Ft. Lauderdale, FL: J. Ross Pub.

CYBER LAWS & NETWORK SECURITY

UNIT-1

Cyber Law: Basic Concepts of Technology and Law : Scope of Cyber Laws, Cyber Jurisprudence. Law of Digital Contracts : The Essence of Digital Contracts, The System of Digital Signatures, The Role and Function of Certifying Authorities. Information Technology Act 2000 and its Amendments.

UNIT – 2

Conventional Encryption : Classical Technique – Modern technique – Algorithms; Public Key Cryptography : Public Key Cryptography – Introduction to Number Theory – Message Authentication and Hash Function – HASH and MAC Algorithm – Digital Signature and Authentication protocol.

UNIT – 3

Network Security Practice: Authentication Application – Electronic Mail Security – IP Security Program Security and System Security: Secure programs – Nonmalicious program errors – viruses and Worms – Memory and address protection – control access to general objects – File protection mechanism – user authentication – Trusted operating system design and assurance – Intrusion Detection system.

UNIT – 4

System Security and Web Security: Intruders,– Firewall - Managing Access – Password management - Web Security requirements – SSL and TLS – SET; Client Side Security : Using SSL – Active Content – Web Privacy. Database Security**:** The Database as a Networked Server, Securing database-to-database communication, Reliability and Integrity of database, sensitive data – inference – multilevel databases. Wireless Network Security: Mobile Security – Encryption Schemes in WLANs – Basic approach to WLAN security and Policy Development – WLAN intrusion process – WLAN security solutions. Digital Watermarking and Steganography: Models of Watermarking – Basic Message Coding – Watermark Security – Content Authentication – Steganography.

REFERENCES SOURCES:

1. Forouzan, B. A., & Mukhopadhyay, D. (2015). *Cryptography and network security (3rd ed.)*. McGraw-Hill Education.
2. Stallings, W. (2006). *Cryptography and network security (7th ed.)*. Pearson Education India.

3. Sood, V. (2013). *Cyber Law Simplified*. Tata McGraw-Hill Education.

4. Alfred Basta et.al. (2018). *Cyber security and cyber Laws.* Cengage learning

5. Sharma, S. (2011). *Information security and cyber laws*. New Delhi: Vikas Pub. House.

6. Pfleeger, C. P., Pfleeger, S. L., & Margulies, J. (2018). *Security in computing*. India: Pearson India Education Services.

7. Stallings, W. (1999). *Cryptography and network security: Principles and practice*. Upper Saddle River,NJ: Prentice Hall.

8. Rittinghouse, J. W., & Ransome, J. F. (2004). *Wireless operational security*. Amsterdam: Elsevier Digital Press.

9. Ben-Natan, R. (2009). *Implementing database security and auditing: A guide for DBAs*, *information security administrators and auditors*. Burlington, MA: Elsevier Digital Press.

10. Stein, L. D. (1998). *Web security: A step-by-step reference guide. Reading*, Mass: Addison-Wesley.

OPEN ELECTIVE: MULTIMEDIA TECHNOLOGIES

UNIT-1

Introduction to Multimedia, Hardware & Software Components of multimedia, Multimedia Authoring and tools. Multimedia Communication Systems, Database Systems , Synchronization issues, Presentation requirements, Applications, Video conferencing, Virtual reality, Interactive Video– Media on Demand. Multimedia applications, evolving systems of multimedia-HDTV, UDTV Digital signal processing.

UNIT-2

Instructional Design, Objectives - Content (print, graphics, sounds, etc.), Interaction , Assessment, Closure, Internet Resources, Graphics, Integrating Web documents, Graphics

Devices: Monitor display configuration, Basics of Graphics Accelerator Card and its importance, Basic concepts of Images: Digital Images and Digital Image Representation Image Formats :TIFF, BMP, JPG/JPEG, GIF, PIC. PDF, PSD: Theory of design, form, line, space, texture, color, typography, layout, color harmony, unity, balance, proportion, rhythm, repetition, variety, economy, still life, light and shade, Poster Design.

UNIT-3

Multimedia elements – text, sound, Images Animation and video Digitalization of audio and video, Different algorithms to text audio, video and images. Input and Output Transducers-Human Vision and Audio Systems and their Limitations - Sampling, Quantization, Coding, Companding.

UNIT-4

Multimedia file formats, standards, communication protocols, conversions, Data compression and decompression. Types and methods of compression and decompression. Architecture of Internet Multimedia Communication- Protocol Stack-Requirements and Design challenges of multimedia communications- Multimedia distribution models-Unicasting, Broadcasting and Multicasting.

REFERENCE SOURCES:

1. Banerji, A., & Ghosh, A. M. (2010). *Multimedia technologies. New Delhi, India*: Tata McGraw Hill.
2. Furht, B. (1998). *Multimedia technologies and applications for the 21st century: Visions of world experts*. Boston: Kluwer Academic.
3. Heath, S. (2017). *Multimedia and communications technology*. New York: Focal Press.
4. Hillman, D. (1998). *Multimedia technology and applications*. Albany: Delmar Publ.
5. Sahoo, R., & Sahoo, G. (2016) . *Multimedia & web technology*. New Delhi, India: New Saraswati House (India).
6. Syed, M. R. (2008). *Multimedia technologies concepts, methodologies, tools, and applications*. Hershey: Information Science Reference.
7. Tse, P. K. (2008). *Multimedia information storage and retrieval: Techniques and technologies*. Hershey, PA: IGI Global.

FOURTH SEMESTER

PROJECT

The project should be undertaken preferably individually or by the group of maximum 3 students who will jointly work and implement the project. The candidate/group will select a project with the approval of the Guide (staff member) and submit the name of the project with a synopsis of the proposed work of not more than 02 to 08 pages within one month of the starting of the semester. The candidate/ group is expected to complete detailed system design, analysis, data flow design, procurement of hardware and/or software, implementation

of a few modules of the proposed work during the semester IV as a part of the term work submission in the form of a joint report. Candidate/group will submit the completed project work to the department at the end of semester IV as mentioned below.

1) **The workable project.**

2) **The project report in the bound journal complete in all respect with the following : -**

    a) Problem specifications.

    b) System definition – requirement analysis.

    c) System design – dataflow diagrams, database design

    d) System implementation – algorithm, code documentation

    e) Test results and test report.

    f) In case of object oriented approach – appropriate process be followed.

The project report should contain a full and coherent account of your work. Although there will be an opportunity to present the work verbally, and demonstrate the software, the major part of the assessment will be based on the written material in the project report. One can expect help and feedback from the project guide, but ultimately it"s the candidates own responsibility. The suggestive structure of a project report should be guided by your guide in selecting the most appropriate format for your project. The term work assessment will be done jointly by teachers appointed by Head of the Institution. The oral examination will be conducted by an internal and external examiner as appointed by the University.

Note:

    l) Project work should be continually evaluated based on the contributions of the candidate/group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.

    2) Two mid-term evaluations should be done, which includes presentations and demos of the work done.