

# COURSE SPECIFICATION

## Choice based Credit System (CBCS) Scheme and course structure for

Masters in Information Technology 1<sup>st</sup> semester effective from academic session 2018 and onwards

Course Code	Name of the Subject	Paper Category	Hours/Week			Credits
			L	T	P	
IT18101CR	Database Systems	Core	3	0	2	4
IT18102CR	Open Source Technologies	Core	3	0	2	4
IT18103CR	Programming with C/C++	Core	3	0	2	4
IT18104CR	Fundamentals of Multimedia	Core	2	0	0	2
<b>Discipline Centric Elective (8 credits)</b>						
IT18105DCE	Advanced Computer Architecture	Elective (DCE)	3	1	0	4
IT18106DCE	Data Communications	Elective (DCE)	3	1	0	4
IT18107DCE	Numerical and Statistical Computing	Elective (DCE)	3	1	0	4
IT18108OE	Fundamentals of Information Technology	Elective (OE)	2	0	0	2
<b>Total Credits</b>						<b>24</b>

## Scheme and course structure for

Masters in Information Technology 2<sup>nd</sup> semester effective from academic session 2018 and onwards

Course Code	Name of the Subject	Paper Category	Hours/Week			Credits
			L	T	P	
IT18201CR	Java Programming	Core	3	0	2	4
IT18202CR	Data structure using C/C++	Core	3	0	2	4
IT18203CR	Operating Systems	Core	3	1	0	4
IT18204CR	Cloud Computing	Core	2	0	0	2
<b>Discipline Centric Elective (8 credits)</b>						
IT18205DCE	Software Engineering	Elective (DCE)	3	1	0	4
IT18206DCE	Wireless Communications	Elective (DCE)	3	1	0	4
IT18207DCE	System Programming	Elective (DCE)	3	1	0	4
IT18208OE	Fundamentals of Network & Internet	Elective (OE)	2	0	0	2
<b>Total Credits</b>						<b>24</b>

**Choice based Credit System (CBCS)**  
**Scheme and course structure for**  
**Masters in Information Technology 3rd semester effective from academic session 2018 and onwards**

Course Code	Name of the Subject	Paper Category	Hours/Week			Credits
			L	T	P	
IT18301CR	Design and Analysis of Algorithms	Core	3	0	2	4
IT18302CR	Python Programming	Core	3	0	2	4
IT18303CR	Dot Net Technologies	Core	3	0	2	4
IT18304CR	Pervasive Computing	Core	2	0	0	2
<b>Discipline Centric Elective (8 credits)</b>						
IT18305DCE	Discrete Mathematics	Elective (DCE)	3	1	0	4
IT18306DCE	Object Oriented Analysis and Design	Elective (DCE)	3	1	0	4
IT18307DCE	Computer Graphics	Elective (DCE)	3	1	0	4
IT18308OE	Project Management	Elective (GE)	2	0	0	2
<b>Total Credits</b>						<b>24</b>

**Choice based Credit System (CBCS)**  
**Scheme and course structure for**  
**Masters in Information Technology 4th semester effective from academic session 2018 and onwards**

Course Code	Name of the Subject	Paper Category	Hours/Week			Credits
			L	T	P	
IT18401CR	Project	Core	0	0	16	8
IT18402CR	Software project/Demo/Dissertation	Core	0	4	0	4
IT18403CR	Internet of Things (IoT)	Core	2	0	0	2
<b>Discipline Centric Elective (8 credits)</b>						
IT18405DCE	Data Warehouse	Elective (DCE)	3	1	0	4
IT18406DCE	Finite Automata and Formal Languages	Elective (DCE)	3	1	0	4
IT18407DCE	Machine Learning	Elective (DCE)	3	1	0	4
IT18408OE	Management Information Systems (MIS)	Elective (OE)	2	0	0	2
<b>Total Credits</b>						<b>24</b>

1<sup>st</sup> Semester

**Course Code: IT18101CR**  
**Course Title: Database Systems**

**Unit I**

Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Architecture, Data Mining and Information Retrieval, Database Models and Comparison, Relation Algebra, ER Model, CODDS Rules, Normalization..

**Unit II**

Introduction to SQL, Data Types, Data Definition Language, Data Manipulation Language, Transaction Control Language, Integrity Constraints, SQL Functions, Set Operators and Joins, View, Synonym and Index, Sub Queries and Database Objects, Locks and SQL Formatting Commands.

**Unit III**

Introduction to PLSQL, Architecture, Data Types, Control Structures, Concept of Error Handling, Cursors and Database Triggers, Subprograms and Packages.

**Unit IV**

Data Storage and Querying using various storage structures, Indexing and Hashing, Query Processing and Optimization. Transaction Management Concepts, Concurrency Control and Recovery.

**Reference Books:**

William Page, "Using Oracle 9i – Special Edition", Que/PHI.

Database System Concepts by A. Silberschatz, H.F. Korth and S. Sudarshan, 6th edition, 1997, McGraw-Hill, International Edition.

Ivan Bayross, "SQL & PL/SQL Using Oracle 8i & 9i with SQLJ", BPB.

Desai.B , "An introduction to Database Concepts", Galgotia Publications, N.Delhi

Dates.C , " An introduction to Database Systems", Pearson Education, Asia

**Course Code: IT18102CR**  
**Course Title: Open Source Technologies**

**Unit I**

Introduction to Linux, History, Difference Between Linux and Windows., Difference Between Linux and Unix, Linux is Virus proof, Various Linux Distributions, Pros and Cons Understanding Files and Directories in Linux - File Structure and hierarchy, File Permissions, root, shell, Using VI editor and command associated with it. Basic Commands –mkdir, touch, ls, pwd, cd, chmod, df, du, dd, adduser, passwd, rm, rmdir, date.

**Unit II**

Introduction to PHP- History of web programming; how PHP fits into the web environment; installation and configuration, syntax, variables, operators, flow control structures  
More language basics; using GET and POST input, working with HTML, forms; built-in and user-defined functions; variable scope; using the PHP manual, getting help

**Unit III**

Input validation, string manipulation and regular expression functions; date and time functions, code re-use, require(), include(), and the include\_path; filesystem functions and file input and output; file uploads; error handling and logging; sending mail, HTTP headers and output control functions; HTTP cookies; maintaining, state with HTTP sessions; writing simple web clients

**Unit IV**

Introducing MySQL; database design concepts; the Structured Query, Language (SQL); communicating with a MySQL backend via the PHP, MySQL API;

**References**

1. N. B. Venkateshwarlu (Ed); Introduction to Linux: Installation and Programming, B S Publishers; 2005.
2. Matt Welsh, Matthias KalleDalheimer, Terry Dawson, and Lar Kaufman, Running Linux, Fourth Edition, O'Reilly Publishers, 2002
3. Programming PHP. RasmusLerdorf, Kevin Tatroe., (O'Reilly, ISBN 1565926102)
4. Learning PHP 5. David Sklar, (O'Reilly, ISBN 0596005601)
5. Core PHP Programming. Leon Atkinson, (Prentice Hall, ISBN 0130463469)

**Course Code: IT18103CR**  
**Course Title: Programming with C / C++**

**Unit I**

Arrays: Declaration; initialization; 2-dimensional and 3-dimensional array, passing array to function, strings and string functions, and character arrays. Pointers: variables, swapping data, swapping address v/s data, misuse of address operators, pointers and arrays, pointers to pointers, strings, pointer arithmetic, additional operators, portability, pointers to functions, using pointers with arrays, void pointers. Structures and unions: syntax and use, members, structures as function arguments, structure pointers, array of structures as arguments, passing array of structure members, call by reference.

**Unit II:**

Functions; prototype, passing parameters, storage classes, identifier visibility, Recursive functions. Command-line arguments. Scope rules, Multi-file programming, Introduction to macros. File processing in C and C++. Introduction to graphics, graphic initialization, graphic modes, drivers, basic drawing functions, Animations- concept and implementation, Building graphical user interface.

**Unit III**

Introduction to classes and objects; Constructor; destructor; Operator overloading; Function overloading; function overriding; friend function; copy constructor; Inheritance: Single, Multiple, and Multilevel Inheritance; Virtual function and Polymorphism: Dynamic binding, Static binding; Virtual functions; Pure virtual function; concrete implementation of virtual functions; Dynamic binding call mechanism; Implementation of polymorphism; Templates: Function Templates, Class Templates, Member Function Template and Template Arguments, Exception Handling, Standard Template Library

**Reference Books:**

1. FOSTER AND FOSTER "C by discovery" RRI penram.
2. YASHWANT KANETKAR "Let us C" PHI.
3. E. BALAGURUSWAMI "Programming in ANSI C" Tata McGraw Hill.
4. BJARNE STROUSTRUP "The C++ programming language" Pearson Education.
5. HERBERT SCHILD "C++ The complete Reference" Tata McGraw Hill.
6. ROBERT LAFORE "Object orientation with C++ Programming" Waite Group.

**Course Code: IT18104CR**  
**Course Title: Fundamentals of Multimedia**

**UNIT I**

Introduction to Multimedia. Definition, Components of multimedia, Multimedia Past and Present; History, Hypermedia, WWW and Internet, Multimedia Today. Users of multimedia, Applications of Multimedia; Education and Training, Entertainment and Art Industry, Engineering, Research, Communication, Medicine, Marketing and Advertising, Journalism, Sports, Gaming.

Graphics and Images: Image Properties; Resolution, Bit Depth, Color, Aspect Ratio, Dpi , Pixels. Popular Image File Formats: JPEG, GIF, PNG, TIFF. Basics of Image Capture.

**UNIT II**

A Multimedia System. Features of a Multimedia System, Multimedia PC workstation components; Input Devices / Capture devices, Storage Devices, Communication Ports, Output / Display Devices. Graphics Processor (Internal and external). Examples of Various Multimedia Systems.

**UNIT III**

Multimedia Configuration: Converging technologies, Functions & subsystems (input, development & output). Multimedia Development Tools: Presentation Tools, Authoring Tools and relevant Examples. Data Compression.

Multimedia Video: Frame Rate, Display; interlaced vs Non-interlaced. Video File Formats: MPEG, AVI. Multimedia Audio: Digital and Analog, Some Audio File Formats. Animation Basics.

**References:**

1. Fundamentals of Multimedia Ze-Nian Li, Mark S.Drew, Jiangchuan Liu, 2<sup>nd</sup> Edition (Pearson)
2. Multimedia in Practice Judith Jeffcote (PHI).

**Course Code: IT18105DCE**  
**Course Title: Advanced Computer Architecture**

**Unit I**

Computer Architecture & Organization. Basic Parallel Processing Architecture, Taxonomy-SISD, MISD, SIMD, MIMD structures, Serial, Parallel & Concurrent Computation, CISC Vs RISC, Structure of Instruction of instruction sets and Desirable Attributes.

**Unit II**

Basic Concepts of pipelining, Instruction Pipelining. Hazards, Reservation Tables, Collision, Latency, Dynamic pipeline, Vector processing & Vector processors. Cache Memory & Virtual Memory: Structure, Analysis & Design. I/O Systems: Design Issues, Performances Measures. Loosely Coupled & Tightly Coupled Systems, Concurrency & Synchronization, Scalability, Models of Consistency, Application of

**Unit III**

SIMD Structure- Definition.Types of Interconnected Networks; Baselines, Shuffle-Exchange, Omega, Cuba, Comparison & Application. Mapping Algorithm to array structures, Systolic processors.Mapping design & Optimization, Wave Front Array processor.

**Unit IV**

Data Flow Graphs, Petri nets, Static & Dynamic DFA. Different Models, Languages, Compilers, dependency Analysis. Message Passing, Program mapping to Multiprocessors, Synchronization

**References:**

1. A Quantitative Approach by David A. Patterson, John L. Hennessy, David Goldberg
2. 2nd Edition Hardcover, 760 pages Morgan Kaufman Publishers Publication date: January 1996
3. A Hardware/Software Approach David Culler and J.P. Singh with Anoop Gupta
4. Solutions to Selected Exercises in Computer Architecture a Quantitative Approach by Thomas E. Willis, Allan D. Knies, Paperback Published by Morgan Kaufman Publishers Publication date: October 1996 ISBN: 1558604065
5. High-performance Computer Architecture (3rd edition), by Harold Stone ,Addison Wesley.
6. Computer Architecture: Pipelined and Parallel Processor Design by Michael J Flynn. Jones and Bartlett Publishers, 1995..



**Course Code: IT18106DCE**  
**Course Title: Data Communications**

**Unit I**

Bandwidth and Channel Capacity. Quantifying Channel Capacity for noiseless channel(Nyquist Law) and noisy channel(Shannon's Law). Example of a digital telephone system to explain basic concepts of analog signals, digital signals, sampling. Data Rate versus Baud Rate. Nyquist Criterion for Sampling. Data transmission concepts. Characteristics of signals(amplitude, frequency, period, wavelength, Signal-to-Noise ratio). Key components in data communications systems. Simplified model. Local area network(LAN) concepts and characteristics.

**Unit II**

Wide area networks(WANs). WAN technologies (traditional packet and circuit switching, Frame Relay, ATM).ISDN(narrowband) concepts and services. Overview of the OSI model. Transmission media – factors affecting distance and data rate. Guided transmission media: Twisted-Pair, Co-axial Cable. Principles and advantages of optical networks. Types of optical fibers and lasers.

**Unit III**

Unguided transmission media: Terrestrial Microwave & Satellite Microwave systems and applications. Data encoding. Difference between modulation and encoding. NRZ-L, NRZ-I encoding. Multilevel Binary and Biphas Coding techniques and their implementations. ASK,FSK,PSK and QPSK. PCM concepts: sampling, quantization. Delta Modulation. Amplitude Modulation.

**Unit IV**

Reliable transmission of data: Asynchronous and Synchronous transmission. Error detection: Parity-based, CRC-based. FCS computation. Error control and recovery techniques. Concept of ARQ standard and its versions. Concept of Multiplexing. FDM. Synchronous and Statistical TDM.

**Reference Books:**

1. William Stallings, "Data and Computer Communications", Pearson Education
2. Andrew Tanenbaum, "Computer Networks", Pearson Education 4/e.
3. Ulysses Black, "Principles of Data Communications ", PHI.
4. Morley, Gelber, "The Emerging Digital Future", Addison-Wesley.

**Course Code: IT18107DCE**

**Course Title: Numerical and statistical Computing**

### **UNIT I**

Introduction. Requirements for computer-oriented solutions to numerical problems. Approximations & Errors – Types of Programming Errors, Computer & Arithmetic Errors, Accuracy and Precision, Round off and Truncation Errors. Propagation of Error. Algorithms to Compute Roots of Equation – Methods of Tabulation or Brute Force Method, Method of Bisection, Secant Method, Newton-Raphson Method, Method for False Position. Implementations of these methods.

Algorithms to Solve Linear Algebraic Equations: Gauss Elimination, Gauss Jordan, Gauss Seidel, L.U. Decomposition,

### **UNIT II**

Lagrange Interpolated Polynomial, Newton Divided Differences Interpolating Polynomial. Implementation of these methods.

Algorithms to solve Ordinary Differential Equations – Euler Method and Modification. The trapezoidal Rule, Simpson's Rule. R-K Method. Implementation of these methods.

### **UNIT III**

Standard Deviation, Correlation, Regression Analysis, Algorithms for Curve Fitting straight line: Least Square Approximation. Concept of Hypothesis, Statistical Tests: Chi-Square Test, Student t-Test, f-Test.

### **REFERENCE BOOKS:**

1. S.C.Chapra & R.P.Canale: “Numerical methods for Engineering”. Tata McGraw Hill.
2. Krishenmurty and Sen : “Numerical Algorithms”
3. V. Rajaraman “Computer oriented numerical methods.” Prentice Hall of India.
4. McCalla, Thomas Richard: “Introduction to Numerical Methods and FORTRAN Programming”, John Wiley & Sons, Inc.
5. Grewal, B. S.: “Higher Engineering Mathematics”, Hindustan Offset Problems Series.
6. “SCHAUM’S Solved Problems Series”.
7. Sharma, K. D.:“Programming in Fortran”.
8. Jain, M. K., Iyengav, S. R. K., Jain, R. K.: “Numerical Methods for Scientific and Engineering Computation”, Wiley Eastern Ltd, New Delhi

**Course Code: IT181080E**

**Course Title: Fundamentals of Information Technology**

**UNIT 1:**

Introduction to Information Technology: Basic concepts of IT, Data Processing: Data and Information. Introduction to Computers: Classification, History, Types of Computers; Mini Computers, Micro Computers, Mainframe Computers, Super Computers. Applications of Information Technology:

Block Diagram of The Computer System, Introduction to various units. Hardware: CPU, Memory, Input and Output devices, Auxiliary storage devices. Software: System and Application Software, Utility packages, Configuration of Computer System . Types of Memory RAM, ROM, PROM, EPROM. Secondary Storage Devices ( FD, CD, HD, Pen drive ). I/O Devices: Scanners Digitizers Plotters, LCD, Plasma Display etc.

**UNIT II**

CPU type and speed; memory: capacity, type, word size, speed. Hard drive: capacity, speed; fire wire, expansion slots, ports. Number System. Binary, octal and hexadecimal number systems; binary addition and subtraction. Integers (positive and negative): sign and magnitude,

BCD, two's complement; representation of characters, ASCII.

Operating System: History, evolution and structures, Introduction to MS-DOS/WINDOWS/LINUX/UNIX. Data Organization: Drives, Files, Directories. Translators: Assembler, Compiler and Interpreter.

**Recommended Books:**

1. Raja Raman V., "Fundamental of Computers" (4th edition.), Prentice Hall of India, New Delhi.
2. Trainer T., et al, "Computers", McGraw Hill.
3. Norton, Peter, "Introduction to Computers, Mc-Graw-Hill.
4. S.Jaiswal, "Fundamental of Computer & IT", Wiley dreamtech India.

**2nd Semester**

**Course No: IT18201CR**  
**Course Title: Java Programming**

**Unit I**

Features of Java, OOPs concepts, Java virtual machine, Reflection byte codes , Byte code interpretation, Data types, variable, arrays, expressions, operators, and control structures Objects and classes Abstract classes, Static classes, Inner classes, Packages, Wrapper classes , Interfaces, This, Super Access control.

**Unit II**

Exception handling - Exception as objects , Exception hierarchy, Try catch finally, Throw, throws IO package - Input streams, Output streams, Object serialization, Deserialization, Sample programs on IO files, Filter and pipe streams Multi threading - Thread Life cycle, Multi threading advantages and issues , Simple thread program Thread synchronization

**Unit III**

JDBC architecture, Establishing connectivity and working with connection interface, Working with statements, Creating and executing SQL statements , Working with ResultSet

**Unit IV**

Overview of JSP, JSP Architecture & life cycle, Components of Java Server Pages, Implicit Objects & Standard JSP Tags, Scope of JSP objects, EJB overview & Architecture, Features of EJB , Developing Web Application with MySQL Database by implementing EJB

**References:**

1. Programming with Java A Primer, E.Balaguruswamy Tata McGraw Hill Companies
2. Java Programming John P. Flynt Thomson 2nd
3. Java Programming Language Ken Arnold Pearson
4. The complete reference JAVA2, Herbert schildt. TMH
5. Big Java, Cay Horstmann 2nd edition, Wiley India Edition
6. Core Java, Dietel and Dietel
7. Java – Balaguruswamy
8. Java server programming, Ivan Bayross SPD

**Course Code: IT18202CR**

**Course Title: Data Structures using C/C++**

### **Unit I**

Introduction: Structure and problem solving, Primitive Data Structures: Operation On primitive Data Structures, Recursion Function and its examples.

String Manipulation, String Matching Techniques & Applications (examples: Text Editing, Lexical Analysis).

### **Unit II**

Concept of Stack and Queue. Singly and Doubly-Linked Lists, Circular Linked List, their implementation and comparison. Array based and Linked List based Implementation of stack and Queues and their applications.

### **Unit III**

Searching: Sequential and Binary Search on Array-based ordered lists. Binary Trees, their implementation and traversal. Binary Search Trees: Searching, Insertion and Deletion of nodes. Height Balance and Concept of AVL Trees. Concept and purpose of B-Trees.

### **Unit IV**

Concept of Hash Functions, Hash-tables and Hashing with Chaining. Sorting Techniques: Insertion Sort, Selection Sort, Quick Sort, Heap Sort. External Sorting: k-Way Merge Strategy. File Structure: Sequential Files, Indexed Files, Direct Files.

### **TEXT BOOKS**

1. Trebley and Sorenson: "An Introduction to Data Structures with Applications" McGraw Hill, Kongakusha 1976.
2. Horowitz and Sahni: "Data Structures" SBCS Publication, 1980.
3. Michael J. Folk et al "File Structure an Object Oriented Approach with C++.
4. Data Structures Using C – Aaron Tenenbaum

### **REFERENCE BOOKS:**

1. Fundamentals of data structures – Ellis Horowitz and Sartaj Sahni
2. Data Structures Files and Algorithms – Abhay K. Abhyankar
3. Data Structures and Algorithms – Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman (Pearson Education)

**Course Code: IT18203CR**  
**Course Title: Operating Systems**

**Unit I**

Overview Of An Operating System, Resource Management, Operating System Interface, Process Management Concepts, Inter-Process Communication, Process Scheduling, Synchronization, Deadlocks. Case Studies Unix/Linux, windows

**Unit II**

Memory Management, Linking, Loading, Memory Allocation, Design Issues and Problems, Virtual Memory, Fragmentation, Implementing Virtual Memory, Paging, Segmentation, Virtual Memory Design Techniques, Buffering Techniques, Spooling. Case Studies Unix/Linux, windows.

**Unit III**

File Management - File Systems & I/O. Device Drivers, Access Strategies, File Systems, File System Organization, Design Techniques. Multiprocessor Systems, Types of Multiprocessor Operating Systems, Design and Implementation Issues. Case Studies Unix/Linux, windows.

**REFERENCE BOOKS:**

1. Dietel, H.M. "An introduction to operating system" Pearson Education, 2/e.
2. Milenkovic.M. "An Operating System – Concepts & Design". McGraw Hill International Education Computer science series 1992.
3. Peterson. J.L. Abharam Silberschatz. "Operating System Concepts". John wiley ,1989.
4. Tananbum, A. S. "Modern Operating System", Pearson Education.
5. Karnetkar, "Unix Shell Programming", BPB.

**Course Code: IT18204DCE**

**Course Title: Fundamentals of Grid and Cloud Computing**

### **UNIT I**

FUNDAMENTALS OF GRID COMPUTING The Grid – Past, Present and Future – Applications of Grid Computing Organizations and their Roles.

GRID COMPUTING ARCHITECTURE Grid Computing Anatomy – Next Generation of Grid Computing Initiatives – Merging the Grid Services Architecture with Web Services Architecture.

GRID COMPUTING TECHNOLOGIES

OGSA – Sample Use Cases that drive OGSA Platform Components – OGSI and WSRF – OGSA Basic Services – Security Standards for Grid Computing – High Level Grid Services.

### **UNIT II**

FUNDAMENTALS OF CLOUD COMPUTING

Fundamentals – Short history of cloud computing – Cloud Architecture – Cloud Storage – Cloud Service – Pros and Cons of cloud computing – Benefits from cloud computing.

### **UNIT III**

CLOUD SERVICES

Need for Web-Based Application – The cloud Service Development – Cloud Service, Development Types – Cloud Service development tools.

### **TEXT BOOKS**

1. Joshy Joseph & Craig Fellenstein, “Grid Computing”, Pearson Education, 2004.
2. Michael Miller, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”, Que, 2008.

### **REFERENCES**

1. Fran Berman, Geoffrey Fox, J.G. Anthony Hey, “Grid Computing : Making the Global Infrastructure a reality”, John Wiley & sons, 2003.
2. Hmar Abbas, “Grid Computing: A Practical Guide to technology and Application Charles River media, 2003.



**Course Code: IT18205DCE**  
**Course Title: Software Engineering**

**Unit I**

Introduction: Software engineering, Evolving role of software, Concept of software, Changing nature of software, Software Myths, Software Importance, Characteristics, Software Components, Software crises, Software Engineering Challenges (Scale, Quality Productivity, Consistency and Repeatability, Change), Software standard, Software Engineering approach.

Software Process Management: Software process, phase's framework, capability maturity model integration (CMMI), Process patterns, process assessment, personal and team process models (PSP, TSP) process technology, characteristics of software process

**Unit II**

Introduction to software process models waterfall, incremental process models, Evolutionary process model. Process Planning, Estimation, COCOMO Model, Project Scheduling and staffing Risk management (concepts, Risk assessment, and Risk control)

Introduction to Software Requirement Analysis and Specification: software requirement, (need for SRS requirement process), problem analysis (informal approach, data flow modeling, object –Oriented modeling, prototyping), requirement specification (characteristics, components), Concept of Use Cases, Concept of validation.

**Unit III**

Design Engineering: Function oriented design, Design principles, Coupling and Cohesion, Design Notations & Specifications, Structured Design Methodology; Object-Oriented Design, OO Concepts, Design Concepts, Design Methodology (Dynamic & Functional Modeling), Design Verification.

CASE (Computer Aided Software Engineering): Concept, scope, CASE Support in Software Life Cycle, Documentation, Project management.

**References:**

1. ROGER S. PRESSMAN - Software Engineering - A Practitioner's Approach, Sixth edition,
2. Pankaj Jalote - An Integrated approach to Software Engineering, 3rd edition, Narosa Publication.
3. Sommerville - Software Engineering. Pearson , 7/e , 2006. SCHAUM'S Outlines, TMH.
4. JAMES F. PETERS Software

**Course Code: IT18206DCE**  
**Course Title: Wireless Communications**

**Unit I**

Classification and types of Wireless telephones. Introduction to Cordless, Fixed Wireless(WLL), Wireless with limited mobility(WLL-M) and (Fully)Mobile Wireless phones. Introduction to various generations of mobile phone technologies and future trends. Wireline vs. Wireless portion of mobile communication networks. Mobile-Originated vs. Mobile-Terminated calls. Mobile-Phone numbers vs. Fixed-Phone numbers; Billing Issues.

**Unit II**

Electromagnetic spectrum, its use and allocation to well-known bands. Concept of cells, sectorization, coverage area, frequency reuse, cellular networks & handoffs. Wireless Transmission concepts; types of antennas, signal propagation, multipath propagation. Comparison of FDM, TDM and CDM techniques. Basic concepts of Spread Spectrum(SS) technique; Direct Sequence SS versus Frequency Hopping SS.

**Unit III**

Simplified implementation of IS-95 CDMA using chip sequences. Concept of CDMA(PCS& Cellular) channel; Forward and Reverse CDMA channel for a cell/sector. Concept of(Walsh)Code Channels within a CDMA Channel. Purpose of Pilot, Sync, Paging, Forward Traffic Channels. Purpose of Access & Reverse TCs. Comparison of Cellular and PCS CDMA networks; frequencies and cell-sizes. Advantages/Disadvantages of smaller cell size. Concept of Voice Coding . Components of Mobile Network Infrastructure: MS, BTS, BSC, MSC; their basic functions and characteristics. Types of handoffs in GSM. Use of HLR and VLR in mobile networks.

**References Books:**

1. Andy Dornan, "The Essential Guide to Wireless Communications Applications", Pearson.
2. Jochen Schiller, "Mobile Communications", Pearson.
3. K.Pahlavan, P.Krishnamurthy, "Principles of Wireless Networks", Pearson Education.
4. Andrew Tanenbaum, " Computer Networks(4th Edition)", Pearson Education.
5. T. Rappaport, "Wireless Communications, Principles and Practice (2nd Edition). Pearson Education

**Course Code: IT18207GE**  
**Course Title: System Programming**

**Unit I**

Introduction, Machine Structure , Evolution of the Components of programming system  
Evolution of Operating Systems, General Machine Structure , General Approach to a New  
Machine , Machine Structure 360-370, Machine Language. Assembly Language

**Unit II**

General Design Procedure, Assemblers, Design of a single pass assembler and multi pass  
assembler, Macros: two pass algorithm, single pass algorithm, Implementation of macro calls  
within macros.  
Loaders and Linkers, Loader Schemes, subroutine linkages, relocating loaders, Linking  
loaders, Design of an absolute loader, Design of a direct linking loader.

**Unit III**

Formal Systems and Programming Languages: Formal specification, Hierarchy of  
Languages, BNF, Canonic Systems and Formal Systems.  
Compilers, Statement of problem, phases of Compiler-Lexical phase, syntax phase  
Interpretation phase, optimization, storage assignment code generation and assembly phase,  
Passes of a compiler.

**Text Book:** John J. Donovan, “Systems Programming”, Tata McGrawHill

**Reference Books:**

Leland L.Beck."System Software" 4th edition Pearson 1997  
Barron.D.W."Assemblers and Loaders" Mc Donald and Javes 1978  
Ullman.J.D."Fundamentals of Programming System" Addison and Wesley  
D.M.Dhamdhere."System Programming and Operating Systems"2nd edition

**Course Code: IT18208OE**

**Course Title: Fundamentals of Network and Internet**

### **UNIT I**

Definitions of data communication and network; communication modes: (simplex, duplex, half duplex), point-to-point, and broadcast. Analog & Digital signal, types of networks: (local area network, wide area network, metropolitan area network). A Data Communication Model and Examples.

Networking Devices: Repeaters, Hubs, Switches, Bridges, Routers, and Gateways. Network

### **UNIT II**

Topologies; Bus, Star, Ring, Mesh, Tree and Hybrid. A Computer network diagram. Addressing: Logical and Physical. Concept of a Protocol. Programs and Processes, Protocol Layering Concepts, Encapsulation and De-capsulation. OSI and TCP/IP model Introduction. Transmission Medium. Types of transmission media: cable/wired media (coaxial, fibre-optic, twisted pair), wireless media (satellite, microwave, infra-red), wireless network technology: (Bluetooth, Wi-Fi), hotspot, modem, bandwidth. Concept of Internet and Intranet

### **UNIT III**

Server, Client and The Client/Server Model. Mail server and Chat Server, HTTP, File Transfer Protocol (FTP), upload, download, World Wide Web (WWW), web browser, web page, website, blogging, Social Networking sites, URL, e-commerce, e-learning, , pod-casting, bulletin board, VoIP. Information Security Basics.

### **References:**

1. "Data Communications and Networking Hardcover" Behrouz A. Forouza, McGraw Hill Education; 5 edition
2. Andrew Tanenbaum, "Computer Networks", Pearson Education 4/e.

3<sup>rd</sup> Semester

**Course Code: IT18301CR**

**Course Title: Design and Analysis of Algorithms**

**Unit I**

Introduction to Algorithms, Analysis of algorithms, Designing Algorithms, Growth of Functions, Asymptotic notations, Recurrences , Substitution method , Iteration method, Recursion trees , The Master Method, Time and Space Complexity study of some basic algorithms.

Randomized Algorithms: Identifying the repeated element, Primality testing, Advantages and Disadvantages.

**Unit II**

Divide and Conquer, General method, Binary search, Quick sort. Greedy Method, General method, Knapsack problem, Single source shortest paths.

**Unit III**

Dynamic programming, General methods, All pair shortest paths, Traveling salesman problems. Backtracking, General method, 8-Queen problem, Sum of subsets, Knapsack problem. Branch and Bound, General method, Least Cost Branch and Bound, 8-Queen Problem, Traveling salesperson problem.

**Unit IV**

Lower boundary theory, Lower bound theory through reductions, P and NP problems. NP hard and NP complete problems. Approximate Algorithms and their need, the vertex Cover Problem, The traveling salesman problem, The subset sum problem.

**Text Book:**

2. Pearson Horowitz, Sahni, “ Fundamentals of Computer Algorithms”, Galgotia Publications
3. Goodrich and Tamassia “ Algorithm design”

**Reference Books:**

1. Cormen, Leiserson, Rivest, Stein, “Introduction to Algorithms”, 2nd edition, PHI.
2. Aho, Hopcroft and Ullman, “The Design and Analysis of Computer Algorithms”, Pearson.

## **Course Code: IT18302CR**

### **Course Title: Python Programming**

#### **Unit I**

Introduction to Python Programming: Features, History and Present, interactive mode and script mode, installing python, basic syntax, Writing and executing simple program. Basic Data Types.

Declaring variables, Performing assignments; arithmetic, logical and relational operations, Comments, Simple input-output. Sequence Control – Precedence of operators, Type conversion

Conditional Statements: if, if-else, nested if –else Looping: for, while, nested loops. Control statements: Terminating loops, skipping specific conditions, use of compound expression in conditional and looping construct.

#### **Unit II**

**String Manipulation:** declaring strings, escape characters, string functions.

**Lists:** basics, list operators (joining, slicing, +, \*, in, not in); inserting, replacing, and removing an element, searching and sorting list. List functions and methods: len(), insert(), append(), extend(), sort(), remove(), reverse(), pop(), list(), count(), extend(), index(), cmp(), max(), min(). [4L]

**Dictionaries:** Basics, Concept of key-value pair, creating, initializing and accessing the elements in a dictionary, traversing, appending updating and deleting elements. Dictionary Functions and methods: cmp(), len(), clear(), get(), has\_key(), items(), key(), update(), values(), pop(), from keys(), dict().

**Tuples:** Immutable concept, creating, initializing and accessing elements in a tuple, Tuple assignment, Tuple slices, Tuple indexing; Tuple Functions: cmp(), len(), max(), min(), tuple(), index(), count(), sum(), any(), all(), sorted(), reversed().

#### **Unit III**

**Functions:** Defining a function, calling a function, Advantages of functions, types of functions, function parameters, Formal parameters, Actual parameters, anonymous functions, global and local variables Modules: Importing module, Creating & exploring modules, Math module, Random module, Time module.

File Input-Output: Opening and closing file, Various types of file modes, reading and writing to files, manipulating directories Exception Handling: What is exception, Various keywords to handle exception such try, catch, except, else, finally, raise–Regular Expressions–Concept of regular expression, various types of regular expressions, using match function.

#### **Unit IV**

**Database and Python:** Connecting to MySQL, Insertion, Retrieval, Updation. Basic Database programming with Python. Introduction to Data Sciences and Tools: NumPy, Matplotlib, SciPy

#### **Reference Books**

1. Python in a Nutshell, 3rd Edition, A Desktop Quick Reference, *Alex Martelli, Anna Ravenscroft, Steve Holden*, O'Reilly Media, 2017
2. Python: A Step by Step for Beginners, *Tom Tiffel*
3. Beginning Programming with Python for Dummies *John Mueller*, Wiley
4. Python Crash Course: A Hands-On, Project-Based Introduction to Programming, *Eric Matthes*
5. Beginning Python: Using Python 2.6 and Python 3, *James Payne*, Wiley India, 2010.

**Course Code: IT18303CR**  
**Course Title: Dot NET Technologies**

**UNIT I**

HTML - Concepts of Hypertext, Versions of HTML, Elements of HTML syntax, Head & Body Sections, Building HTML documents, Inserting texts, Images, Hyperlinks, Backgrounds and Colour controls, Different HTML tags, Table layout and presentation, Use of font size & Attributes List types and its tags, Use of Frames and Forms in web pages

Introduction to .NET Framework, .NET Architecture, CIL and JIT, Assemblies, Managed Code, Garbage Collection, MSIL and Metadata, CLR, CLI, CLS.

**UNIT II**

**VB.NET Concepts:** Flow Control, Type Conversions, Complex Variable Types, Arrays, Structs, String Manipulation. Functions, Debugging and Error Handling. Object Oriented Programming using C#, Collections, Comparisons and Conversions. Generics.

**UNIT III:**

**Basic Windows Programming:** Controls, Button, Label and Link Label, Text Box, Radio and Checkbox, RichTextBox, List and CheckBoxes, TreeView and ListView Controls, Tab Control. Menus and ToolBars, SDI and MDI Applications.

**UNIT IV**

**ASP.NET Web Programming:** Site Management (Client and Server Side), Styles, Master Pages, Site Navigation, Authentication and Authorization, Web Service. **Data Access:** Streams, XML, Connection and Command Objects, Data Reader, Data Adapter, Data Set.

**Text Book :** Professional VB.NET 2010 by Christian Nagel , Bill Evgen , Jay Glynn Wrox Publications , 2006.

**Reference**

1. Dietel&Dietel , “VB.NET , How to Program”,Pearson Education.
2. Visual Basic.Net by John Sharp & John Jagger, PHI, New Delhi.
3. Visual Studio .Net by Francisco, Microsoft Publication.



**Course Code: IT18304CR**  
**Course Title: Pervasive Computing**

**Unit I**

Technologies : Past, Present, Future , Pervasive Computing , The pervasive computing market, Device Technology : Hardware , Human-machine interfaces , Biometrics , Operating Systems , Java for Pervasive devices , Device Connectivity : Protocols , Security , Device Management , Web Application Concepts : History of World wide Web . World Wide Web Architecture, Protocols, Transcoding, Client Authentication via the Internet.

WAP : Introduction , Components of the WAP architecture , WAP infrastructure , WAP Security Issues , Wireless Markup Language , WAP push , Products , i-mode , Voice Technology :

**Unit II**

Wireless Markup Language , WAP push , Products , i-mode , Voice Technology : Basics of Speech Recognition , voice standards , speech applications , speech and pervasive computing, security, Personal Digital assistants : History , Device Categories , PDA Operating Systems , Device Characteristics , Software Components , Standards , Mobile Applications , PDA browsers.

**Unit III**

Architecture : Server Side Programming in Java : J2EE and overview , Servlets, Enterprise Java Beans , Java Server Pages , Extensible Markup Language , Web services , Model-View-Controller Pattern, Pervasive web application architecture : Background , scalability and availability ,

Smart Card-based authentication via the Internet, Ordering goods , Access via WAP : WAP functionality , Implementation , Access from Personal Digital Assistants: Extending the example application to personal digital assistants. Implementation for synchronized devices, for intermittently connected devices, for connected devices. Access via voice:

**Reference Books :**

1. JochenBurkhardt, Dr. Horst Henn , Stefan Hepper , Klaus Rintdorff, Thomas schack “ Pervasive Computing “ Technology and Architecture of Mobile Internet Applications , Pearson Education.

**Course Code: IT18305DCE**  
**Course Title: Discrete Mathematics**

**UNIT I**

Proposition, Logic, Truth tables, Propositional Equivalence, Logical Equivalence, Predicates and Quantifiers, Sets: operations on sets, Computer representation of sets, Functions: Domain, Range, One-to-One, Onto, Inverses and Composition, Cardinality of a Set, sequences and summations, The growth of functions . Methods of Proof: Different methods of proof, Direct Proof, Indirect Proof, Mathematical Induction for proving algorithms. Counting: Basic Counting Principle, The Pigeon-Hole Principle, Permutation, combinations, repetitions, discrete probability, Advanced Counting Techniques: Inclusion-Exclusion, Applications of inclusion-exclusion principle.

**UNIT II**

Recurrence relations, solving recurrence relation. Relations: Relations and their properties, Binary Relations, Equivalence relations, Diagraphs, Matrix representation of relations and digraphs, Computer representation of relations and digraphs, Transitive Closures, Warshall's Algorithm. Partially Ordered Sets (Posets), External elements of partially ordered sets, Hasse diagram of partially ordered set, isomorphic ordered set, Lattices: Properties of Lattices, complemented Lattices.

**UNIT III**

Graph theory: Introduction to graphs, Graph Terminology Weighted graphs, Representing Graphs, Connectivity of Graphs: Paths and Circuits, Eulerian and Hamiltonian Paths, Matrix representation of graphs. Graph Coloring. Trees: Rooted trees, Application of trees: Binary Search Trees, Decision Trees, Prefix Codes, Tree traversal, trees and sorting, spanning trees, minimal spanning trees. Finite Boolean algebra, Functions on Boolean algebra, Boolean functions as Boolean polynomials. Groups and applications: Subgroups, Semigroups, Monoids, Product and quotients of algebraic structures, Isomorphism, Homomorphism

**Text Book :**

KENNETH H. ROSEN "Discrete Mathematics and Its Applications" The Random House/Birkhauser Mathematics series

**Reference Books:**

1. LIU "Elements of Discrete Mathematics " Tata McGraw Hill
2. SCHAUMS "Discrete Mathematics " Tata McGraw Hill
3. KOLMAN/REHMAN "Discrete Mathematical Structures " Pearson Education
4. NICODEMI "Discrete Mathematics " CBS

## **Course No: IT18306DCE**

### **Course Title: Object Oriented Analysis & Design**

#### **Unit I**

OOAD – Introduction , Applying UML and Patterns in OOAD , Assigning Responsibilities , What is analysis and Design , An Example , The UML , Iterative Development –an Unified Process idea , Additional UP Best Practices and Concepts , The UP Phases and Schedule oriented Terms , The UP disciplines. Process Customization and the development case. The Agile UP. The Sequential Waterfall Lifecycle. Inception. Artifacts that may start in inception, Understanding requirements, types of requirements.

#### **Unit II**

Use –case Model , Writing requirements in context , goals and stories , background , use cases and adding value , use cases and functional requirements , use case types and formats . Goal and scope of a use case , Finding primary actors , goals and use cases , writing use cases in an essential UI-free style , Actors , Use Case Diagrams , Use Cases within the UP , Case Study. Identifying other requirements. From inception to elaboration.

Use Case Model : Drawing System Sequence Diagrams. Example of an SSD. SSDs and Use Cases , System Events and the System Boundary , Name System Events and Operations , Showing Use Case Text , SSDs within the UP

#### **Unit III**

.Domain Model : Visualizing Concepts , Domain Models , Conceptual Class Identification , Candidate Conceptual classes , The UML association notation , NextGen POS Domain Model Associations , NextGen POS Domain Model , Adding Attributes , Non Primitive Data Type Classes , Adding Detail with Operation Contracts , Contract Sections , Post Conditions , Contracts , Operations and the UML. Operation Contracts within the UP.

From Requirements to Design , Interaction Diagram Notation , Sequence and Collaboration Diagrams , GRASP , Responsibilities and methods , interactions diagrams , Patterns , GRASP : Pattern of General Principles in Assigning Responsibilities , Information Expert , creator , Low Coupling , High Cohesion , Controller , Object Design and CRC Cards , Design Model : Use Case Realization with GRASP Patterns , Determining Visibility , Creating Design Class Diagrams , Mapping Design to Code

#### **Reference Books:**

1. James Rumbaugh, “Object Oriented Models and Design” Pearson Education 2/e
2. Ali Bahrani “Object Oriented Systems Development” McGraw -Hill 1999
3. Lafore Robert, “Object Oriented Programming in C++”, Galgotia Publications.
4. Balagurusami, E, “Object Oriented with C++”, Tata McGraw-Hill.
5. D. Ravichandran, “Programming with C++”, McGraw-Hill Publications

**Course Code: IT18307DCE**  
**Course Title: Computer Graphics**

**Unit I**

Introduction to Computer Graphics. Applications of Computer Graphics. Graphic Display Devices\_ Raster, Refresh, Random. Display Buffer, Concept of Double Buffering and Segmentation of Display Buffer. Use of Lookup tables. OpenGL API.

2-D Graphics. Cartesian and Homogeneous Coordinate Systems. Line drawing algorithms (Bressenham's and DDA). Circle and Ellipse Drawing Algorithms. 2-Dimensional Transformations. Concepts of Window & Viewport, Window to Viewport Transformations. Filling, Boundary and Floodfill algorithms.

**Unit II**

Clipping, Line Clipping Algorithms (Cohen-Sutherland Algorithm), 3-D Graphics, Projections: perspective and parallel projection transformations. 3-Dimensional Transformations. Hidden Surface Removal Techniques, Z-Buffer Algorithm, Back Face Detection.

**Unit III:**

Curves and Surfaces, Splines, Spline specification, Interpolated & Approximated Splines. Bezier Splines, Bezier Curves, Cubic Bezier Curves, Bezier Surfaces. B-Splines curves and surfaces. Fractals - Fractal Generation Procedure.

Text Book : Hearn and Baker "Computer Graphics" 2nd Edition , Pearson Education.

**Reference Books**

1. W.M.Newman and Sproull. "Principles of interactive Computer Graphics" ,TMH
2. Steven Harrington." Computer Graphics a Programming Approach" McGraw Hill.
3. Plastock and Kelley. "Schaums outline of theory and problems of computer Graphics"
4. David F Frogers and J Alan Adams. "Procedural Elements of Computer Graphics" McGraw Hill
5. David F Rogers and J Alan Adams. "Mathematical Elements of Computer Graphics" McGraw Hill
6. James. D. Foley, A Vandam etal "Computer Graphics" Pearson.

**Course Code: IT163080E**  
**Course Title: Project Management**

**UNIT I - INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT**

Project Definition – Contract Management – Activities Covered By Software Project Management – Overview of Project Planning – Stepwise Project Planning. Strategic Assessment – Technical Assessment – Cost Benefit Analysis. Cash Flow, Forecasting.

Cost Benefit Evaluation Techniques – Risk Evaluation. Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks.

**UNIT II - PROJECT EVALUATION AND MONITORING**

Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control. Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control.

Understanding Behavior Organizational Behavior: A Background –Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation– The Old man – Hackman Job Characteristics Model – Working In Groups – Becoming A Team – Decision Making – Leadership – Organizational Structures.

**TEXT BOOK:**

1. Bob Hughes, Mikecatterell, “Software Project Management”, Third Edition, Tata McGraw Hill, 2004. REFERENCES: 1. Ramesh, Gopaldaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
2. Walker Royce, “Software Project Management - A Unified Framework”, Pearson Education,2004.
3. Jalote, “Software Project Manangement in Practive”, Pearson Education, 2002. 2. Humphrey Watts, “Managing the Software Process”, Addison Wesley, 1989.

4<sup>th</sup> Semester

**Course Title: Project Course Code: IT18401CR (8 Credits)**

**Course Title: Software projects/Demonstration/Dissertation**

**Course Code: IT18402CR (4 Credits)**

**Course Code: IT18403CR**  
**Course Title: Internet of Things (IOT)**

**UNIT I**

Introduction to IoT, Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs

Brief History and evolution of IoT, Trends in the Adoption of IoT, Risks, Privacy, and Security

IoT & M2M Machine to Machine, Difference between IoT and M2M, Software define Network

**UNIT II**

Network & Communication aspects - Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination.

Challenges in IoT- Design challenges, Development challenges, Security challenges, Risks and Privacy challenges, Introduction to different IoT tools.

Reference Books:

1. Vijay Madiseti, ArshdeepBahga, "Internet of Things: A Hands-On Approach"
2. WalteneagusDargie,ChristianPoellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"
3. The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press).



**Course Code: IT18405DCE**  
**Course Title: Data warehousing**

**Unit I**

Data warehouse: Definitions, features, building blocks/ components, data marts, Meta data in data warehouse; planning a data warehouse, The project team, project management considerations, Business requirements; data design, the architectural plan, Data storage specifications, Information delivery strategy.

**Unit II**

Architecture and Infrastructure: Concept of data warehouse architecture, operational infrastructure, physical infrastructure, hardware and operating systems, database software, tools. The role of metadata, metadata types, metadata requirements. Principles of dimensional modeling: Dimensional modeling basics, Use of CASE tools, The STAR schema, The Snowflake Schema.

**Unit III**

Data Extraction, Data Transformation, Data Loading. Data Quality: Need, Data Quality Challenges, Data Quality Tools. Information access and delivery, Information delivery tools. Online Analytical Processing (OLAP): Features, functions, OLAP models, Implementation considerations, OLAP platforms, OLAP tools and products.

**Unit IV**

Introduction to Data Mining: definitions, Data mining techniques, applications. Physical Design in data warehouse: Steps, Physical Design considerations, Physical storage. RAID technology, estimating storage sizes, Indexing the data warehouse: B-Tree Index, Bitmapmed Index, Clustered Index Performance Enhancement Techniques: Data Partitioning, Data Clustering, Parallel processing, data arrays. Data warehouse deployment.

**Text Book:**

Paulraj Pooniah , “ Data Warehousing Fundamentals “ Wiley

**Reference:**

Alex Berson , Stephen J. Smith “ Data Warehousing , Data Mining and OLAP , Tata McGraw Hill , 2004 Tenth reprint 2007.

Sam Anahory , Dennis Murray ,” Data Warehousing in the real world “ , Pearson Education.

**Course Code: IT18406DCE**

**Course Title: Fine automata & Formal Languages**

**Unit I**

Basic concepts of theory of computation: Formal Languages and Grammars, Finite State Transducers, Finite-State Automata and Regular Languages, Limitations of Finite-Memory Programs.

Recursive finite-domain programs, Recursion,

**Unit II**

Pushdown Transducers, Context-Free Languages, Limitations of Recursive Finite-Domain Programs

Turing Machines. Programs and Turing Transducers, Universal Turing Transducers, Undecidability.

**Unit III**

Introduction to resource-bounded computation, Time and Space, A Time Hierarchy, Nondeterministic Polynomial Time, some *NP*-Complete Problems

**Text Book:**

1. Hopcroft, J., and Ullman, J. (1979), "*Introduction to Automata Theory, Languages and Computation*", Pearson Education.

1. P. Linz, "*Introduction to Formal Languages and Automata*", 3rd edition, 2000, Jones and Barlett, PWS Publishing Company.

**Suggested Readings:**

1. Eiton Gurarri : *Introduction to Theory of computation*, Computer Science press

2. Hopcroft J, R. Motwani, and J. Ullman, "*Introduction to Automata Theory, Languages and Computation*", 3rd Ed. 2006, Pearson Education.

**Course Code: IT18407DCE**  
**Course Title: Machine Learning**

**Unit I**

Introduction to learning. Types of Learning, Rote learning, Learning by parameter adjustment, Learning by general problem solving, Concept learning, Learning by analogy

Introduction to machine learning, Why machine learning. Types of problems in machine learning, History of machine learning, Aspects of inputs to training, Learning systems.

Supervised learning, unsupervised learning, Reinforcement learning etc.

**Unit II**

Classification Algorithms: KNN and effect of various distance algorithms (Euclidean, Manhattan, Mahalanobis Distances, etc.)

Decision tree learning algorithms: Introduction, Inference model, general domains, symbolic decision trees, consistency, learning trees from training examples, entropy, mutual information, ID3 algorithm.

**Unit III**

Support Vector Machines: Kernel functions, Linear SVM, Nonlinear SVM. Genetic algorithm, Regression analysis, Multivariable regression.

Clustering Algorithms: K-mean clustering, fuzzy K-means, hierarchical clustering.

**Unit IV**

Neural Networks. Artificial Neural Networks Basics, ANN - Learning Process, Types of Networks, Perceptron, Multilayer Perceptron, Error back Propagation Algorithm, RBF Networks.

**References:**

1. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press.
2. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer.
3. Christopher Bishop, Pattern Recognition and Machine Learning, Springer.
4. Tom.M.Mitchell, Machine Learning, McGraw Hill International Edition
5. EthernAlpaydin, Introduction to Machine Learning. Eastern Economy Edition, Prentice Hall of India.

**Course Code: IT184080E**  
**Course Title: Management Information systems**

**Unit I**

Organization and Information Systems , Changing Environment and its impact on Business - The IT/IS and its influence - The Organization: Structure, Managers and activities - Data, information and its attributes - The level of people and their information needs - Types of Decisions and information - Information System, categorization of information on the basis of nature and characteristics. , Transaction Processing System (TPS) - Office Automation System (OAS) - Management Information System (MIS) - Decision Support System (DSS) and Group Decision Support System (GDSS) - Expert System (ES) - Executive Support System (EIS or ESS).

Need for System Analysis - Stages in System Analysis - Structured SAD and tools like DFD, Context Diagram Decision Table and Structured Diagram

**Unit II**

System Development Models: Water Flow, Prototype, Spiral, RAD – Roles and responsibilities of System Analyst, Database Administrator and Database Designer. Information systems for Accounting, Finance, Production and Manufacturing, Marketing and HRM functions - IS in hospital, hotel, bank.

Enterprise Resources Planning (ERP): Features, selection criteria, merits, issues and challenges in Implementation - Supply Chain Management (SCM): Features, Modules in SCM - Customer Relationship Management (CRM): Phases

**Unit III**

Knowledge Management and e-governance, Nature of IT decision - Strategic decision - Configuration design and evaluation Information technology implementation plan.

Security and Ethical Challenges, Ethical responsibilities of Business Professionals – Business, technology, and Computer crime – Hacking, cyber theft, and unauthorized use at work. Piracy – software and intellectual property. Privacy – Issues and the Internet Privacy. Challenges – working condition, individuals. Health and Social Issues, Ergonomics and cyber terrorism.

**RECOMMENDED BOOKS:**

1. “Management Information Systems”, Kenneth J Laudon, Jane P. Laudon, Pearson/PHI,10/e, 2007
2. “Management Information Systems”, W. S. Jawadekar, Tata McGraw Hill Edition, 3/e, 2004
3. Turban, Efraim, Ephraim McLean, and James Wetherbe. 2007. Information Technology for Management: Transforming Organizations in the Digital Economy. New York, John Wiley & Sons

