COURSE SPECIFICATION

Choice based Credit System (CBCS)
Scheme and course structure for
Information Technology 1st semester effective from academic session 2016 and onwards

Course Code	Name of the Subject	Paper Category	Hours/Week			Credits
			L	T	P	
IT16101CR	File & Data structure	Core(CR)	4	0	0	4
IT16102CR	Advanced Computer Architecture	Core(CR)	4	0	0	4
IT16103CR	Open Source Technologies	Core(CR)	3	0	2	4
IT16104DCE	Operating System	Elective (DCE)	3	0	0	3
IT16105DCE	Programming with C/C++	Elective (DCE)	2	0	2	3
IT16106GE	Pervasive Computing	Elective (GE)	3	0	0	3
IT16107GE	Fundamentals of Grid and Cloud Computing	Elective (GE)	3	0	0	3
IT16108OE	Fundamentals of Programming	Elective (OE)	2	0	0	2
IT16109OE	Fundamentals of Information Technology	Elective (OE)	2	0	0	2

Course Code: IT16101CR
Course Title: File and Data structures

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 SartajSahni

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: IT16102CR
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: IT16103CR
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: IT16104DCE
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.

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.

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.

Unit IV

Unix/ Linux Operating Systems, Users View, Design Principles, Implementation, Process Management, Memory Management, File System, I/O System.

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.AbharamSilberschatz. “Operating System Concepts”. John wiley ,1989.
4. Tananbum, A. S. “Modern Operating System”, Pearson Education.
5. Karnetkar, “Unix Shell Programming”, BPB.

Course code:- IT16105DCE
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; virtual destructors.

Unit IV

Templates: Function Templates, Class Templates, Member Function Template and Template Arguments, Exception Handling, Standard Template Library

Reference Books:

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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: IT16106GE
Course Title: Pervasive Computing

Unit I

Technologies : Past, Present, Future , Pervasive Computing , The pervasive computing market, m-Business , Conclusions and Challenges , Future , Application Examples , 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.

Unit II

WAP : Introduction , Components of the WAP architecture , WAP infrastructure , WAP Security Issues , 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 , Development of pervasive computing web applications , Pervasive application architecture.

Unit IV

Example Application:Introduction , User Interface overview , Architecture , Implementation. Access from PCs: 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 : Extending the example application to voice access , Implementation.

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: IT16107GE
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.

UNIT II

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 III

FUNDAMENTALS OF CLOUD COMPUTING

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

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UNIT IV

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: IT16108OE
Course Title: Fundamentals of Programming

UNIT I

Introduction to problem, Problem Solving Strategy, solving. Flowchart Definition and Importance of flowchart. Symbols of Flowchart. Flow lines, Terminals, Input/Output ,Processing Decision, Connection off-page connectors Guidelines for preparing Flowchart. Flowchart structure Sequence, selection, repetition. Limitation of flowchart.

UNIT II

Introduction to Algorithms. Developing and writing algorithm using pseudo codes. Representation of Algorithms as program, pseudo code and flowchart. Time and Space Complexity of an Algorithm. Common examples for designing Algorithms.

UNIT III

Introduction to Programming languages, Types of Programming languages. High level , Assembly level, Machine level languages and their advantages & Limitations. Scripting Languages. High level languages tools: Editors, Compilers, Interpreters, Linker & loader, GUI , IDE. Type of Program errors, testing a program.

UNIT IV

Introduction to programming with C. Introduction to the concept of flowcharts, algorithms and programming simple flowcharts Fundamentals of C-Variables, data types, arithmetic expression, their priorities etc.Library functions. Control Structures of C:- for, while and do loops, if then else statements, switch statements. Arrays: Their creation and manipulation, multi-dimensional arrays.

References:

1. "Let Us C " Yashwant Kanetkar
2. "Fundametals of Programming Languages" Palak Kamlesh Tolani , Pearson edition.
3. "The Art of Programming Through Flowchart and Algorithm " Anil Bik as Chaudhuri.
4. Introduction to programming languages. Arvand Kumar Bansal CRC press.

Course Code: IT16109OE
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: Wide range of applications in: Home, Education and Training, Entertainment, Science, Medicine, Engineering etc.

UNIT II

Elements of a Computer System: 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 (Primary And Secondary); RAM, ROM, PROM, EPROM. Secondary Storage Devices (FD, CD, HD, Pen drive). I/O Devices: Scanners Digitizers Plotters, LCD, Plasma Display etc.

UNIT III

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.

UNIT IV

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

Recomended 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.