DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SYLLABUS FOR BCA PROGRAMME

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RAJIV GANDHI UNIVERSITY,

RONO HILLS, DOIMUKH

(w.e.f. academic session 2019-20)

Course Structure

FIRST SEMESTER

Paper Code	Title	Credit	Mark Distribution			
			End Semester	Sessional	Practical	Total
CSUG-101	Fundamental of Computers	3-1	50	20	30	100
CSUG-102	Introduction to Programming	2-2	50	20	30	100
CSUG-103	Digital Electronics	3-1	50	20	30	100
CSUG-104	Mathematics –I	3-0	80	20	-	100
CSUG-105	Sociology and Environmental Studies	2-0	80	20	-	100

SECOND SEMESTER

Paper Code	Title	Credit	Mark Distribution			
			End Semester	Sessional	Practical	Total
CSUG-106	Computer Organization and Architecture	3-1	80	20	-	100
CSUG-107	Introduction to Theoretical Computer Science	3-0	80	20	-	100
CSUG-108	Data Structure	3-1	50	20	30	100
CSUG-109	Object Oriented Programming	3-1	50	20	30	100
CSUG-110	Mathematics –II	3-0	80	20	-	100

THIRD SEMESTER

Paper Code	Title	Credit	Mark Distribution			
			End Semester	Sessional	Practical	Total
CSUG-201	Java Programming	2-2	50	20	30	100
CSUG-202	Introduction to Database Management System	3-1	50	20	30	100
CSUG-203	Operating System	3-1	50	20	30	100
CSUG-204	Data Communication and Computer Network	3-0	80	20	-	100
CSUG-205	Financial Management Concept and Techniques	3-0	80	20	-	100

FOURTH SEMESTER

Paper Code	Title	Credit	Mark Distribution			
			End Semester	Sessional	Practical	Total
CSUG-211	Introduction to Web Technology	3-1	50	20	30	100
CSUG-212	Computer Graphics and Multimedia (New Course)	3-1	50	20	30	100
CSUG-208	System Software	3-0	80	20	-	100
CSUG-213	Python Programming	3-1	50	20	30	100
CSUG-210	Algorithm Design	3-0	80	20	-	100

Industrial Tour of one week during summer break	No Credit, Mandatory, Presentation and Grading to be done on 5THsemester

FIFTH SEMESTER

Paper Code	Title	Credit	Mark Distribution			
			End Semester	Sessional	Practical	Total
CSUG-308	Android Programming	2-2	50	20	30	100
CSUG-302	Software Engineering	3-1	50	20	30	100
CSUG-303	Communication Skills and Technical writing	2-1	80	20	-	100
CSUG-304	Project – I	0-6	-	-	-	200

SIXTH SEMESTER

Paper Code	Title	Credit	Mark Distribution			
			End Semester	Sessional	Practical	Total
CSUG-305	System and Network Administration	3-1	50	20	30	100
CSUG-306	Principle of Management	2-0	80	20	-	100
CSUG-307	Project – II	0-8	-	-	-	300

BACHELOR OF COMPUTER APPLICATIONS (BCA)

FIRST SEMESTER

CSUG- 101: FUNDAMENTALS OF COMPUTERS (3-1)

Current trends in Computer System, current hardware and software. Functional units comprising a typical computer configuration: input/output, fixed and removable data storage, internal storage, control and arithmetic/logic unit. The concepts relating to execution speed, data access times, storage capacities and similar comparative aspects of hardware performance.

The alternatives available for hardware configuration, including mainframe architecture, stand-alone workstations, networks, client-server.

The alternatives available for data storage, their operational characteristics and relative advantages and disadvantages.

Operating Systems, Windows, Linux etc. Application software, role and functions of commonly available applications such as word processors, spreadsheets, SPSS, data managers, presentation and publication software etc.

Programming Concept: Flow charts and algorithms. Data communications concepts, transmission media; network concepts such as network types, network topologies and TCP/IP; Hardware essentials for a computer network; Computer network applications, typical applications within an organisation, e.g. financial, inventory and personnel management.

Internet, Multimedia, WWW, FTP, E-mail, Web pages. Concept of VPNs, Corporate Networks. Concept of Network security and management.

Books/References:

1. Fundamentals of Computers, ITL ESL, PEARSON, 1st Edition, 2007
2. Fundamental of Computer Science and Information Technology: U K Singh, S Jain, AMaheshwari, SSDN Publication, 1st Edition, 2012.
3. Foundations of Information Technology: D. S. Yadav; New Age International, 3rd Edition, 2006.

CSUG-102: INTRODUCTION TO PROGRAMMING(2-2)

The problem solving process and strategies; programming paradigms – procedural, structured, object oriented and generic approaches; algorithms; programs (algorithm+data structure); data abstraction.

Basic data types and fundamental programming constructs (control structures); syntax and semantics of a higher-level language; variables, constants, operators, expressions, and assignment; functions as building blocks of structured programming; recursions; searching and

sorting algorithms. Array data type and use of arrays; character data type and text processing; functional and procedural abstraction; Pointer data type and simple applications of pointers.

Principle of modeling (abstraction and decomposition); graphic models for structured programming; problems with structured programming; modular programming and abstract data types; program design and evaluation (module coupling and module strength); problem solving using structured programming - coding, debugging and testing using C.

Books/References:

1. The C Programming Language (Ansi C Version), Brian W. Kernighan, Dennis M. Ritchie, PHI Learning
2. Computing Fundamentals and C Programming, Balaguruswamy, TMH
3. Programming Language-Paradigm and Practice, Doris Appleby, Julius J. VandeKopple, TMH
4. Mastering C Programming, Dixit, New Age

CSUG-103: DIGITAL ELECTRONICS (3-1)

UNIT – I
Data types and Number systems, Binary number system, Octal & Hexadecimal number system,1's & 2's complement, Binary Fixed-Point Representation, Arithmetic operation on Binary numbers,Overflow & underflow, Floating Point Representation, Codes, ASCII, EBCDIC codes, Gray code, Exces-3 & BCD, Error detection &correcting codes

UNIT – II
Logic Gates, AND, OR, NOT GATES and their Truth tables, NOR,NAND & XOR gates, Boolean Algebra, Basic Boolean Law's, Demorgan's theorem, MAP Simplification, Minimization techniques, K -Map , Sum of Product & Product of Sum

UNIT – III
Combinational & Sequential circuits, Half Adder & Full Adder, Full subtractor, Flip-flops - RS, D, JK & T Flip-flops, Shift Registers, RAM and ROM, Multiplexer, Demultiplexer, Encoder, Decoder, Idea about Arithmetic Circuits , Program Control, Instruction Sequencing

UNIT – IV
I /O Interface , Properties of simple I /O device s and their controller, Isolated versus memory-mapped I/O, Modes of Data transfer, Synchronous & Asynchronous Data transfer, Handshaking,Asynchronous serial transfer, I /O Processor

UNIT – V
Auxiliary memory, Magnetic Drum , Disk & Tape, Semi-conductor memories , Memory Hierarchy, Associative Memory, Virtual Memory, Address space & Memory Space, Address

Mapping, Page table, Page Replacement, Cache Memory, Hit Ratio, Mapping Techniques, Writing into Cache.

Books/References:

1. BARTEE, Digital Computer Fundamentals ,TMH Publication.
2. MALVINO, Digital Computer Electronics, TMH Publication.
3. MORRIS MANO, Computer System Architecture, PHI Publication.

CSUG-104: MATHEMATICS-I(3-0)

Set Theory:
- Set, relations, equivalence relations; mappings-one-one and on to ;

- Definition of an algebraic structure;

- **Introduction to** groups, subgroups, normal subgroups, isomorphism, homeomorphism;

automorphism of groups; semigroups, monoids, rings, vector space.

Matrix and Determinant:

- Matrices and system of linear equations; Determinants; Alzebra of Matrices, Inverse of Matrices, Solution of linear equation by matrices.

Logic :

- Logic operators, Truth table, Normal forms

- Theory of inference and deduction.

- Mathematical induction.

- Predicate calculus; predicates and quantifiers.

- Boolean algebra.

- Lattice.

Combinatorics :

- Basic counting techniques.

- Permutations and combinations, the Binomial theorem

- Recurrence relations and their solutions.

- Generating functions.

Graph Theory:
- Elements of graph theory; Circuits and graph theory; Trees; Applications of graphs as models

Books/References:

1. Discrete Mathematics: D. P. Acharjya; New Age International
2. Discrete and Combinatorial Mathematics: Ralph P Grimaldi; Pearson Education

CSUG-105: SOCIOLOGY AND ENVIRONMENT (2-0)

SOCIOLOGY PART:

The nature of sociology: The meaning of sociology, the scientific and humanistic orientations to sociological study.

Basic concepts: Society, community, institution, association, group, social structure, status and role etc.

Institutions: Family and kinship, religion, education, politics, etc.

The individual in/and society: Society, culture, and socialization, relation between individual and society Social control: norms, values, and sanctions.

Social change: Meaning and type: evolution and revolution, progress and development, factors of social change.

The uses of sociology: Introduction to applied sociology, sociology and social problems, sociology and social change, sociology and social policy and action, sociology and development, sociology and professions.

ENVIRONMENT PART:

Environmental studies: definition, scope and importance.

Need for public awareness:

Institutions in environment, people in environment

Natural resources: introduction:

Natural resources and associated problems

Non-renewable resources

Renewable resources

Forest resources: use and over-exploitation, deforestation timber extraction, mining, dams and their effects on forests and tribal people

Water resources: use and over-utilisation of surface and ground water floods, drought, conflicts over water, dams – benefits and problems.

Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources

Food resources: world food problems, changes in landuse by agriculture and grazing, effects of modern agriculture, fertilizer/ pesticide problems, water logging and salinity

Energy resources: increasing energy needs, renewable/ non renewable, use of alternate energy sources

Land resources: land as a resource, land degradation, man-induced land-slides soil erosion and desertification.

Role of an individual in conservation of natural resources.

Equitable use of resources for sustainable lifestyles.

Ecosystems:

> Concept of an ecosystem

Biodiversity and its conservation:

> Definition: genetic, species, ecosystem diversity

> Value of biodiversity: consumptive, productive use, social, ethical, aesthetic and option values

> Biodiversity at global, national and local levels

> India as a mega diversity nation

> Endangered and endemic species of india

Environmental pollution:

> Definition, causes, effects and control measures of:

> Air, water, soil, marine, noise, thermal pollution and nuclear hazards

Role of individuals in pollution prevention.

Disaster management: floods, earthquakes, cyclones, landslides.
Urban problems related to energy.

Water conservation, rain water harvesting, watershed management.

Environmental ethics: issues and possible solutions .

Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and nuclear holocaust.
Environment protection act.

Population explosion – family welfare program.

Environmental and human health.

Human rights.

HIV/AIDS.

Women and child welfare.

Role of information technology in environment and human health.

Books/References:

1. UGC recommended Text Book on Environmental Studies available free in the UGC website, www.ugc.ac.in
2. Introductory level books on Sociology, or/and materials/references recommended/provided by the instructor/department.

CSUG-106: COMPUTER ORGANISATION AND ARCHITECTURE(3-1)

UNIT-I: Instruction set architecture- types, formats, addressing modes; Register set; Processor organization, Register organization and stack organization. Assembly language programming. Data path organization, Control unit design - Hardwired control, Microprogramming.

UNIT-II: Computer arithmetic- Review of addition and subtraction; Multiplication- Booth's, Array; Division- Restoring and non-restoring; Floating point arithmetic. ALU.

UNIT-III: Memory Organization: Interfacing of memory with processor, Memory hierarchy, Multiple-module memory, Cache memory, Virtual memory. Memory Devices.

UNIT-IV: Input/ output Organization: Synchronization of data transfer- strobed and handshaking; I/O mapping and control- Program controlled, Interrrupt driven, DMA, Interrupt and DMA mechanisms and controllers.

UNIT-V: CISC and RISC architecture, Instruction pipelining. Concept of parallel processing.

Books/References:

1. Computer organization and architecture: Williams Stallings, PHI Pvt. Ltd.
2. Structured Computer organization: Tanenbaum, PHI Pvt. Ltd.
3. Computer organization: Carl Hamachar, ZvonkoVranesic and SafwatZaky, McGraw Hill International/Tata McGraw Hill.

CSUG-107: INTRODUCTION TO THEORETICAL COMPUTER SCIENCE (3-0)

UNIT I: Basics of Theory of Computation; Discrete Structure, Logic Automata, Computational Complexity. Algorithm Design Techniques : Recursion, Iteration, etc. Static & Dynamic Data Structures.

UNIT II: Alphabets, classes of Languages, formal Grammars. Finite automata: regular expressions, regular languages.

UNIT III: Time complexity and NP-completeness. Applications to programming languages and analysis of algorithms.

UNIT IV: Context free languages: pushdown automata, DCFLs, LL(k) and LALR grammars. Context sensitive languages: linear bound automata.

UNIT V: Turing machines: recursively enumerable languages. Operations on formal languages and their properties. Decision questions on languages, decidable and Undecidable problems.

Books/References:

1. Theory of Computer Science: K L P Mishra, N Chandrasekaran; PHI Pvt. Ltd.
2. Theory of Computation: A M Natarajan, A Tamilarasi, P balasubramani; New Age International
3. Discrete and Combinatorial Mathematics: Ralph P Grimaldi; Pearson Education
4. Introduction to Automata Theory: John E Hopcroft, Rajeev Motwani, Jeffrey D Ullman; Pearson Education

CSUG-108: DATA STRUCTURES(3-1)

Basic Concepts: Data Structures, Algorithms, Complexity of algorithms.

Basic data types, Lists, Stacks, Queues.

Trees: Definition and Implementation; Binary trees, Tree traversal, Postfix, Prefix notations.

Sets: Implementation; Dictionary, Hash table, Priority queues; Advanced Set Representation Methods - Binary search tree, AVL tree, Balanced tree, Sets with Merge and Find operation.

Directed graphs: Representation; Single source shortest path problem, All pair shortest path problem, Transitive closure.

Undirected graph : Minimum spanning tree

Sort Algorithms: Quick-sort, Heap-sort, Bin-sort, Selection,

Memory management, *Garbage Collection.*

Books/References:

1. Data Structures using C amd C++ Yedidyahlangsam, Moshe J. Augenstein, Aaron M. Tenenbaum, PHI (EEE)
2. Data Structures and Algorithms: Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, Pearson
3. Data Structures in C++: N.S. Kutti, P.Y. Padhye, PHI

CSUG-109:OBJECT ORIENTED PROGRAMMING (3-1)

Unit I: Structured Programming & Object oriented Programming Paradigms.

Unit II: Classes, objects, abstraction and encapsulation; constructors and destructors; friend functions and class; inheritance, polymorphism and overloading; templates; exception handling, RTTI, STL;

Unit III:OO design basics: finding objects (informal descriptions, domain analysis, etc.), finding classes, classification techniques, class roles, finding interactions, etc., Dynamic Model and functional Model; Phases of Object oriented Development.

Unit IV: Unified Modeling Language (UML) : History, Goals, Concepts of UML.

UML Views: Static View, Case View, Interaction View, State Machine View, Activity View, Physical View, and diagrammatic representations.

Case studies in object oriented application design.

Books/References:

1. Herbert Shield: The Complete Reference to C++, Tata McGraw Hill.
2. Ram Baugh et al: Object Oriented Modeling and Design, PHI(EEE).
3. Ram Baugh, Booch, Jacobson: Unified Modeling Language Reference Manual.

CSUG-110: MATHEMATICS II(3-0)

Limits & continuity; Differentiation & its applications; Integration & its applications; Derivatives of elementary functions and their inverse, L'Hospital's rule. Extreme values of functions.
Techniques of integration (substitution, by parts, partial fraction, trigonometric integrals, trigonometric substitution);
Elementary ideas of Series and Sequence of real numbers and their convergences by GP series and ratio test.
Elementary ideas of Functions of several variables and partial derivatives; Introduction to ordinary differential equations.
Error analysis; Solving linear and nonlinear equations by approximation, Newton Raphson method; Interpolation and extrapolation; Numerical integration.

Books/References:

1. Differential Calculus: Das and Mukherjee, S. Chand
2. Integral Calculus: Das and Mukherjee, S. Chand
3. Finite Diffrence: H. C. Saxena;

CSUG-201- JAVA PROGRAMMING (2-2)

UNIT1: Introduction - History-Java and the Internet-Java Applets and Applications-Features of Java-Data types-Literals-Variables-Type conversion and casting-Arrays-one and Multidimensional arrays-Operators-Arithmetic, Boolean logical, Relational and Bitwise operators-Operator Precedence. Classes and Objects - General form of a class-Creating objects-Constructors-Parameterized constructors-Defining methods-Overloading methods-Returning a value-Returning an object-Recursion-Access control-Garbage collection-finalize () method-this keyword and instance variable hiding-Static variables and methods-Defining constants using final.

UNIT 2: String Handling - String Constructors-String length-String Literals-String Concatenation-String concatenation with other data types-String conversion and toString()-Character Extraction- String Comparison-Searching Strings- Modifying a String- Data Conversion and valueOf()-Changing the case of characters-String Buffer.

UNIT 3: Inheritance - Basics-Member Access and Inheritance- Super class variable referring to a sub class-Applications of keyword super- Creating a Multilevel Hierarchy-Order of calling constructors-Method Overriding-Dynamic method dispatch-Abstract classes-Using final with Inheritance. Packages and Interfaces - Defining a package- CLASSPATH -Defining an Interface - Implementing interfaces-Variables in interfaces-Extending interfaces.

UNIT 4: Exceptions- Types - Uncaught Exceptions - try and catch - Multiple catch - Nested Try - throw, throws and finally-Built-in Exceptions. Multithreaded Programming - The Java Thread Model- Thread Priorities- Synchronization.

UNIT 5: Java.io Package-I/O Basics-Reading console Input-Writing console output-PrintWriter class-Reading and Writing files-Java I/O classes and interfaces-File class-Stream classes-Byte Streams-Character Streams.

UNIT 6: Applets-Applet basics-Applet Architecture-Applet life cycle-Applet display methods-Repaint-Status window-passing parameters to applets-getDocumentBase() and getCodeBase()-

AppletContext and showDocument().Event Handling-Event handling mechanisms-Delegation Event Model-Event classes-Sources of events-Event listener interfaces-Handling mouse and keyboard events-Adapter classes-Inner classes.

UNIT 7: AWT-AWT classes-Window fundamentals-working with frame windows-Creating a frame window in an applet-Creating a windowed program-Displaying information within a window AWT Controls, Layout Managers and Menus – Control fundamentals-Labels-Buttons-CheckBoxes-CheckBoxGroup-ChoiceControl-Lists-ScrollBar-TextField-TextArea-LayoutManagers-MenuBars and Menus-DialogBoxes- FileDialog- Handling events by extending AWT components.

Books/References:

1. Herbert Schildt, The Complete Reference- Java, TMH Publication
2. Deitel and Deitel, Java Programming, PHI
3. E. Balagurusamy, Programming with JAVA a Primer, TMH Publication

CSUG-202: INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS (3-1)

*Overview :*Concept of database, data independence, redundancy Control; Database architecture - ANSI model.

Modeling of real world situation: Entity-relationship model; Data models: Network, Hierarchical, Relational.

Relational data model: DDL, DML: relational algebra and calculus; functional dependencies, normal forms, decomposition, integrity rules; Query languages for relational systems: SQL, QBE, query optimization, embedded SQL.

Database transactions, concurrency control, recovery and security issues in databases.

Brief treatment of: Client-server models, distributed databases, object-oriented databases, deductive databases, multimedia databases, active databases.

Books/References:

1. Database system concepts: Silberschatz and Korth; McGraw Hill.
2. Fundamentals of database systems: Elmasri and Navathe; Narosa Publishing
3. Database Management System: Rajesh Narang; PHI Pvt. Ltd.
4. Database Development: An Overview: NIIT: PHI Pvt. Ltd.

CSUG-203: OPERATING SYSTEM (3-1)

INTRODUCTION: Operating System, Multiprocessor Systems, Distributed Systems, Parallel Systems, Real-Time System, Batch processing System, Computing Environments

COMPUTER- SYSTEM STRUCTURES : Computer- System Operation, I/O Structure, Storage Structure, Storage Hierarchy, Hardware Protection, Network Structure

OPERATING SYSTEM STRUCTURES: System Components, Operating- System Services, System Calls, System Programs, System Structure, Virtual Machines, System Design and Implementation, System Generation

PROCESSES AND MULTITHREADING: Process Concept, Process Scheduling, Operations on Processes, Cooperating Processes, Interprocess Communication, Communication in Client – Server Systems, Multithreading Models

CPU SCHEDULING: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Algorithm Evaluation, Process Scheduling Models

MEMORY MANAGEMENT: Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with Paging,

FILE- SYSTEM INTERFACE & IMPLEMENTATION: File-system interface-File Concept, Access Methods, Directory Structure, File- System Mounting, File Sharing, Protection.**File System implementation-**File- System Structure, File- System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and performance, Recovery

I/O SYSTEMS& MASS STORAGE STRUCTURE: **I/O Systems:** I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O to Hardware Operations, STREAMS, Performance. **Mass Storage Structure:** Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management.

Books/References:

1. Tanenbaum, Operating System, Pearson Education
2. Milenkovic, Operating Systems: Concepts and Design, McGraw Hill.
3. Sillberschatzet. al, Operating Systems, Wiley India.
4. Bill Fenner, A M Rudoff, UNIX network programming Vol-1: W R Stevens, PHI Pvt. Ltd.

CSUG-204: DATA COMMUNICATION AND COMPUTER NETWORK (3-0)

1. Data Communication
   1.1 Data Communication concepts and terminologies
        1.1.1   Data representation
        1.1.2   Data transmission
        1.1.3   Transmission channels

       1.1.4   Signal encoding

       1.1.5   Transmission impairments

   1.2 Transmission media

       1.2.1   Guided transmission media

                Twisted pair, Coaxial and Optical fiber

       1.2.2   Wireless transmission

                Terrestrial microwave, satellite microwave, Broadcast Radio and Infrared

   1.3 Data communication interface

       1.3.1   Asynchronous and Synchronous transmission

       1.3.2   Baseband and Broadband transmission

       1.3.3   Modulation methods

       1.3.4   Modems

       1.3.5   Multiplexing

2. Evolution of computer networks:
   2.1 Circuit switching
   2.2 Development of packet switching: 1961-1972
   2.3 Proprietary networks and internetworking: 1972-1980
   2.4 Proliferation of networks: 1980-1990
   2.5 The internet explosion: 1990s
3. Network standards and protocols
   3.1 The IEEE standards
   3.2 OSI 7 layer model
   3.3 TCP/IP protocol suit
4. OSI model implementation
   4.1 Data Link Layer: Frame design, Flow control, Error handling, HDLC, PPP, Sliding window protocol
   4.2 Network Layer: IPv6, X.25, Frame Relay, ATM, Routing, Queuing theory
   4.3 Transport Layer: TCP, UDP, Congestion control, Flow control, Socket interface
   4.4 Application Layer: SNMP, Authentication, Encryption, Web and HTTP, FTP, Email, DNS, Network File System (NFS) and File sharing, Remote Procedure Calling (RPC)
5. Local Area Network (LAN)
   5.1 Needs, Architecture and Technology
   5.2 Ethernet: CSMA/CD operation, parameters and specifications
   5.3 Cabling: 10Base5, 10Base2, 10BaseT, 10BaseF, Hubs, patch panels and wiring closets
   5.4 Bridges, Switches, 100BaseT, 100BaseVGANY,Gigabit Ethernet
   5.5 FDDI, Token Ring, Wireless, ISDN, B-ISDN
6. VSAT technology
7. Multimedia networks
8. Network Computing
9. Network security and management

Books/References:

1. Stallings, W.; Data and Computer Communications; Prentice Hall of India.
2. Tanenbaum A.S.; Computer Networks; Prentice Hall of India.

3. Kurose and Ross; Computer Networking; Addison Wesley
4. Prakash C. Gupta; Data Communication; Prentice Hall of India

CSUG-205: FINANCIAL MANAGEMENT: CONCEPT AND TECHNIQUES(3-0)

Unit I: An overview of entrepreneurship, Entrepreneurial characteristics, Rewards and drawbacks of entrepreneurship, Entrepreneurship and innovation, Entrepreneurial creative-innovative process, Planning finance for entrepreneurial ventures, Organizing and financing the new venture, Marketing and new venture development, Product and service concept for new ventures, Managing entrepreneurial ventures.

Unit II: Financial Management: Meaning and role. Ratio Analysis, Fund Flow statements : Meaning of the terms- fund, flow and fund, working capital cycle, preparation and interpretation of the fund flow statement. Costing : Nature, Importance and basic principles. Budget and Budgetary Control : Nature and scope, Importance, Method of finalization of master budgets and functional budgets.

Unit III: Financial records and statements. Principles and practices of financial managements. Tools for financial management. IT as a tool for financial management.

Current trends in electronic financial management.

Unit IV: Accounting : Principles, Concepts and conventions, Double entry system of Accounting, Introduction of basis books of accounts of sole proprietry concern, Control accounts for debtors l and creditors, closing of books of accounts and preparation of Trail Balance. Final Accounts: Trading, Profit and Loss Accounts and Balances Sheet of Sole Proprietary concern with normal closing entries.

Unit V: Introduction to Computerised Accounting Systems : Master files, Transaction files, Introduction to documents used for data collection, processing of different file and output obtained.

Books/References:

1. Financial Accounting: Maheswari S. K.: TMH publishers
2. Financial Management: Khan M. Y. and Jain, P K:, TMH publishers
3. Fundamentals of Business Organisation and Management: Y. K. Bhusan: Sultan Chand Publication

CSUG-211: INTRODUCTION TO WEB TECHNOLOGY (3-1)

Unit I
Introduction to WWW : Protocols and programs, secure connections, application and development tools, the web browser, What is server, choices, setting up UNIX and Linux web servers, Logging users, dynamic IP
Web Design: Web site design principles, planning the site and navigation,

Unit II
Introduction to HTML : The development process, Html tags and simple HTML forms, web site structure Introduction to XHTML : XML, Move to XHTML, Meta tags, Character entities, frames and frame sets, inside browser.

Unit III
Dynamic HTML: Introduction of DHTML- HTML vs. DHTML, Advantages of DHTML, CSS of DHTML, Event Handling, Data Binding, Browser Object Models.

Unit IV
Style sheets : Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2

Unit V
Javascript : Client side scripting, What is Javascript, How to develop Javascript, simple Javascript, variables, functions, conditions, loops and repetition

Unit VI
XML : Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML with application.XML, XSL and XSLT. Introduction to XSL, XML transformed simple example, XSL elements, transforming with XSLT

Unit VII
PHP : Starting to script on server side, Arrays, function and forms, advance PHP
Databases : Basic command with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP myadmin and database bugs.

Reference Books:
1.HTML Black Book, Steven Holzner, Dremtech press.
2.Web Technologies: A Computer Science Perspective by Jeffrey C. Jackson, Prentice Hall, 2006.
3. Web Applications : Concepts and Real World Design, Knuckles, Wiley-India

CSUG-212: COMPUTER GRAPHICS AND MULTIMEDIA (3-1)

Unit-I Introduction: A Survey of Computer Graphics- Computer Aided Design, Presentation Graphics, Computer Art, Entertainment, Education and Training, Visualization, Image Processing, Graphics User Interface;

Overview of Graphics Systems : Video Display Devices – Refresh Cathode-Ray Tubes, Raster-Scan Displays, Random-scan Displays, Color CRT Monitors, Direct-View Storage Tubes, Flat-Panel Displays, Three-Dimensional Viewing Devices, Stereoscopic and Virtual-Reality Systems; Raster-Scan Systems; Random-Scan Systems; Graphics Monitors and Workstations; Input Devices;

Unit –II Display and drawing of graphics primitives: Points and Lines; Line Drawing Algorithms-General Line Equation, DDA Algorithms, Bresenham's Line Algorithm; Circle-Generating Algorithm- Equation of a Circle, Bresenham's Circle Algorithm; Curves and Text;

Unit III Filled Area Primitives : Scan-Line Polygon Fill Algorithm, Boundary-Fill Algorithm, Flood-Fill Algorithm

Unit IV Geometric Transformations : Basic 2D Transformations – Translation, Rotation, Scaling; Matrix Representation and Homogeneous Coordinates; Translation along x-axis, y-axis; Rotation about origin, Rotation about a pivot point; Scaling about origin, Scaling relative to a fixed Point; Three Dimensional Transformations

Unit V Two-Dimensional Viewing : Coordinate Conventions-world coordinates, device coordinates, normalized device coordinates, view-port and window; Clipping Operations – Point Clipping, Line Clipping, Cohen-Sutherland Line Clipping, Polygon Clipping, Sutherland-Hodgeman Polygon Clipping, Other Polygon-Clipping Algorithms, Transformations in 2D and 3D: translation, rotation, scaling, reflection, Projection: perspective and parallel projections, isometric projection, Transformation matrices;

Unit VI Volume and Surface Representation,Fractal modelling; Hidden surface and line elimination; Computer Animation: fundamental concepts.

Books/References:

1. James D. Foley, Andries Van dam, Steven K. Feiner& John F. Hughes, Computer Graphics – Principles and Practices, Pearson Education.
2. Donald Hearn and M Pauline Baker, Computer Graphics, PHI
3. Woo, Neider, Davis, Shreiner, "Open GL Programming Guide", Pearson Education.
4. David F. Rogers, Procedural Elements for Computer Graphics, Tata-McGraw Hill.

CSUG-208: SYSTEM SOFTWARE (3-0)

Unit I: Overview:Definition and classification of system software.
Unit II: Assembler:Assembly language, assembly process, assembler data structures, assembler macros and microprocessors.

Unit III: Linkers and loaders: Basic concepts, static and dynamic linking, shared libraries, loaders, overlays.
Unit IV: Compilers: Introduction and phases of a compiler: Lexical Analysis, parsing & intermediate code generation

Books/References:

1. Aho, Ullman, Sethi, *Compiler Design*,PEARSON
2. Dhamdhere, *System Programming & Operating system*, Tata McGraw Hill

CSUG 213: PYTHON PROGRAMMING (3-1)

Unit I: Introduction : Installation and working with Python, Python interpreter.Introduction to Python Programming Language: operators, variables, data types, Lists, Dictionaries, Sets, Tuples and Strings.

Unit II: Program Flow Control: Statements and Expressions, Control structures: if, else, elif, While loop, Loop manipulation using pass, continue, break and else.

Unit III:Functions: Definition, call, positional and keyword parameter. Default parameters, variable number of arguments. Modules: import mechanisms, Functional programming : map, filter, reduce, max, min. lambda function.

Unit IV: Object Oriented Programming: classes and objects, inheritance, polymorphism, error processing, Exceptions handling.

Unit V: File Processing: reading and writing files, manipulating file pointer using seek.

Reference Books:

1. Charles Dierbach, Introduction to Computer Science Using Python : A Computational Problem-Solving Focus, John Wiley, 2012

2. Kenneth A. Lambert, The Fundamentals of Python: First Programs, 2011 Cengage Learning, ISBN: 9781111822705

3. Paul Barry, Head First Python, 2nd Edition, O'Reilly

CSUG-210: ALGORITHM DESIGN (3-0)

Review of basic data structures such as stack, queue, linked list, trees and graphs.

Algorithm Design Methods:General Consideration, Algorithm design paradigms

Divide and Conquer: Binary search, Merge Sort, Quick Sort, Arithmetic with Large integers

Greedy Method: Minimal Spanning Tree, Shortest Paths, Knapsack

Dynamic Programming: Chained Matrix Multiplication, Optimal Storage on Tapes, Shortest Paths, Optimal Search Trees

Backtracking: 8-queens problem, Graph Colouring, Hamiltonian Cycles

Branch and Bound: 0/1 Knapsack problem, Travelling Salesperson

Approximation: Graph Colouring, Task Scheduling, Bin Packing

Probabilistic Algorithms: Numerical Integration, Primality Testing

Books/References:

1. Aho, J. Hopcroft and J.Ullman, The design and Analysis of Computer Algorithms, Addison Wesley.
2. E. Horowitz and S. Sahani, Fundamentals of Computer Algorithms, Galgotia, New Delhi.
3. S.E. Goodman and S.T. Hedetniemi, Introduction to the Design and Analysis of Algorithms, McGraw Hill.
4. G. Brassard and P.Bratley, Algorithmics, PHI.
5. S.K. Basu, Design Methods and Analysis of Algorithms, PHI.
6. T.H. Coremen, et. al, Introduction to Algorithm, PHI.

CSUG-308: ANDROID PROGRAMMING (2-2)

Unit 1
Introduction and Basics of Android, android Versions,Features of android,architecture of android,the android market,Setting up development environment -android studio,android sdk,Android Virtual Device (AVD)

Unit 2
Basic Building blocks Activities, Fragments, and Intents: understanding Activities, Activity Lifecycle, Application Manifest, Activity Example, Intents,Intent example, Fragments, life Cycle of a Fragment

Unit 3
Introduction to Android User Interface: Styles & Themes ,Views and Viewgroups,**Types of Layout:**FrameLayout ,LinearLayout, RelativeLayout ,TableLayout,scrollView,Grid Layout ,constraint layout,units of measurement, display orientation, action bar

Unit 4
 Basic UI Design: TextView , EditText ,Button , ImageButton , CheckBox , ToggleButton , RadioButton , RadioGroup,ToggleButton ,ProgressBar ,AutoCompleteTextBox ,timepicker View,Datepicker View,listView View,spinner View,Specialized fragmenttypes,Alert Dialogs & Toast ,ImageView,ImageSwitcherview,GridView,WebView, using menus With VieWs

Unit 5
Data Persistence: saving and loading user preferences, persisting data to files, Creating and using databases,IntroducingSQLite,
Content Providers: sharing Data in android, using a Content provider,
Web Services:Receiving HTTP Response (XML, JSON), Parsing JSON and XML,UsingWebView

Unit 6
Messaging:SMS Messaging, sending email, **Location**:Based Services- Displaying Maps, Google API for Maps, getting location Data

Reference:
1. Beginning.Android.Programming.with.Android.Studio.4th.Edition,J.F. DiMarzio,Wiley&Sons
2. Android Programming for Beginners,JohnHorton,Packt Publishing
3. Professional Android 4 Application Development by Reto Meier

CSUG-302: SOFTWARE ENGINEERING (3-1)

Unit I: Introduction to software engineering: Concept of a software project, size factor, quality and productivity factor different phases of Software development life cycle.

Unit II: Software project management: planning, scheduling, monitoring, controlling etc. requirementspecifications

Software design: function oriented, object oriented approaches, user interfaces.

Software programming: Structured coding techniques, coding styles, standards.

Unit III: Software verification and validation: theoretical foundation, black box and white box approaches, integration and system testing

Software reliability: definition and concept of reliability, software faults, errors, repair and availability.

Unit IV: CASE studies

Books/References:

1. Jalote, P., *An Integrated approach to software engineering*, Narosa Publishing House.
2. Pressman, R. S., *Software Engineering: A practical Approach*; McGraw-Hill.
3. Humphery, W. S., *Managing software Procedures*, Addission-Wesley

CSUG-303: COMMUNICATION SKILLS AND TECHNICAL WRITING (2-1)

Unit I: Communication: an overview; vitals of communication, creativity in communication, communications with concern and empathy, Johari window, interpersonal; communication, communicating body, body language, distance and positioning, body orientation.

Unit II: Hearing and Listening, barriers of good listening, Speaking, speech style, presentation, visual aids, group discussion, ,meeting, telephonic communication.

Unit III: Act of negotiation, negotiation style, know your opponent, hurdles in negotiation, negotiating cultural diversities.

Unit IV: Talk in team, team talk dynamics, social distance, conflict management, communication in teams.

Unit V: Instructional writing, abstract writing, business terminology, business letters, minute writing, report writing. Technical writing: Defining the objectives, identifying and assessing the audience, organization and language, writing process, technical reports, proposal writing, technical description, process description.

(In addition to those, students may go for self studies on topics like mind mapping, learning process, creativity and profession, creativity in workplace etc,.)

Books/References:

1. Communication Skills for Engineers: Sunita Mishra, C. Muralikrishna; Pearson Education.
2. Professional Communication for UP Technical University: M Ashraf Rizvi; McGraw Hill.

CSUG-304: PROJECT – I (0-6)

CSUG 305: SYSTEMS AND NETWORK ADMINISTRATION (3-1)

Major components of the Linux operating systems. File system, setting user and group ownership of files and directories and access permissions, basic commands for starting and stopping processes, basic process attributes and their role in access control, mounting and unmounting file systems and partitions.

Python Programming:

Linux kernel program, starting and stopping a Linux system, setting up user and group accounts on single machines, the basics of backup and restore procedures.

Linux system monitoring and logging. Examining the list of running processes on the system and understand the data presented there. Monitoring memory usage and disk space usage on the system. Customizing system log configuration.

The rules governing IP address classes and netmasks, Configuring the resolver library to arrange for TCP/IP name service, Bringing interfaces up and down, and set their IP addresses and netmasks, Setting the default route in the kernel routing table. Understanding the significance of the /etc/services file and well-known port numbers, Configuring the inet daemon, Using telnet to contact servers directly, using the ping command to test network connectivity, netstat command to examine kernel tables pertaining to networking, traceroute command to discover network paths, tcpdump to examine all network traffic. Methods used to bring interfaces up and down.

Basics of configuring and using the Domain Name Service, sendmail, the Network Information System, Network File System: Structure and function of the Domain Name Service (DNS), Setting up a Linux machine to function as a DNS server, Configuring and using sendmail, Setting up an NIS domain with an NIS master server and NIS clients.

Basic network security issues and solutions.

Setting up a Linux machine to act as an NFS server, Setting up a Linux machine to act as an NFS client

Incremental back up. Monthly back. Mail server setup

Books:

1. Red Hat Linux: Proffitt: PHI
2. UNIX Network Programming- Vol-I and Vol-II: Stevens: PHI

3. Introduction to System Administration: IBM series: PHI

CSUG306: PRINCIPLE OF MANAGEMENT (2-0)

Unit I: Management: Meaning, nature, importance and elements of management. Administration and management, limitations of management. Levers of management. Development of management through different schools of management.

Critical study of Taylor, Fayol, Siman and Peter Brucker, Hawthorre experiments and contribution of behavioural scientists.

Unit II: Planning: Nature of planning, problems of planning, types of planning, steps in planning. Management by Objectives.

Unit III: Organization : Definition~ Theories of organization Classical, Neoclassical and modern theory. 'Principles of organization different approaches of analysis decision approach emperica1 approach etc. Types of organization~ line functiona1~ line of staff, formal and informal etc. Departmentation, delegation, de-centralization.

Unit IV: staffing: Nature and object, manpower planning, sources of supply of manpower, recruitment, training & development and leadership.

Unit V: Motivation: Meaning, importance, Financial and Non-financial incentives

Unit VI: Coordination: Meaning, importance, methods.

Unit VII: Controlling: steps involved in controlling, essentials of a good control system, budgetary and non-budgetary control.

Unit VIII: Decision making : Meaning, importance, process and quantitative techniques of decision making. Fore-casting: elements of forecasting, methods of forecasting.

Unit IX: Direction and communication: Meaning, types and importance.

Unit X: Management and Society: Need of management in society, Social responsibility of management.

Reference Books:

1. Harold Koontz, Principles Of Management (Ascent Series), TMH
2. D.K.Sharma, Business Administration, Centrum Press
3. Tripathi, Principles of management, TMH

CSUG 307: PROJECT-II (0-8):