

BCA - SEMESTER IV

CA4CRT10 - Design and Analysis of Algorithms (Core)

Theory:4 hrs. per week

Credits:4

Unit 1: (12 hrs.)

Introduction, Definition of Algorithm, Algorithm design techniques, Algorithm Analysis, performance analysis - space complexity, time complexity, Best, Worst, And average case complexity.

Unit 2 (14 hrs.)

Divide and Conquer General method, Binary search, finding the maximum and minimum, merge sort, quick sort, performance measurement of quick sort, Selection, Strassen's matrix multiplication.

Unit 3 (18 hrs.)

Greedy Algorithm General Characteristics of greedy algorithms, Problem solving using Greedy Algorithm - Knapsack problem, Minimum Spanning trees (Kruskal's algorithm, Prim's algorithm).

Unit 4: (16 hrs.)

Dynamic programming The general method, multistage graphs, all-pairs shortest path, Single source shortest path, 0/1 Knapsack problem, Traveling Sales person problem.

Unit 5: (12 hrs)

Basic traversal and search techniques - BFS and traversal, DFS and traversal, Bi-connected components and DFS, Backtracking General method, 8-queens problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles.

Book of study:

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekharan, Computer algorithms/C++,Second Edition, Universities Press.

References:

1. Anany Levitin- Introduction to design and analysis of algorithms, Third Edition, Addison Wesley Low price edition.
2. Richard Neapolitan & Kumarss Naimipour, Foundation of Algorithms using C++ Pseudocode, Third edition, Jones And Bartlett Publishers.

CA4CRT11 - System Analysis & Software Engineering (Core)

Theory:4 hrs. per week

Credits:4

Unit 1: (12 hrs.)

Information systems concepts, Business information systems; Describing the business organization – organization chart , organization function list ; information system levels - operational, lower, middle, top management; SDLC Life cycle activities- life cycle flow chart, task, management review, baseline specifications, role of system analyst.

Unit 2: (14 hrs.)

Introduction to Software Engineering - Definition, Program Vs Software, and Software process, Software Characteristics, Brief introduction about product and process, Software process and product matrices. Software life cycle models , Definition, Waterfall model, Increment process models- Iterative , RAD , Evolutionary process models-Prototyping ,Spiral. Selection of a life cycle model.

Unit 3: (18 hrs.)

Software Requirement Analysis and Specification Requirements Engineering type of requirements, Feasibility Studies, Requirement Elicitation – Use Case, DFD, Data Dictionaries , Various steps for requirement analysis, Requirement documentation, Requirement validation, an example to illustrate the various stages in Requirement analysis. Project planning-Size estimation, cost estimation, the constructive cost model (COCOMO).

Unit 4: (14 hrs.)

Software Design - Definition, Various types, Objectives and importance of Design phase, Modularity, Strategy of design, Function oriented design, IEEE recommended practice for software design descriptions. Steps to Analyze and Design Objected Oriented System. Software Reliability Definition, McCall software quality model, Capability Maturity Model.

Unit 5: (14 hrs.)

Software Testing : What is testing?, Test, Test case and Test Suit, Verification and Validation, Alpha, beta and acceptance testing, functional testing, techniques to design test cases, boundary value analysis, Equivalence class testing, decision table based testing, cause effect graphing technique, Structural testing path testing, Graph matrices, Data flow testing; Levels of testing Unit testing, integration testing, system testing, validation testing,

Book of Study:

1. Marvin Gore & John Stubbe -Elements Of System Analysis, Fourth Edition, Galgotia Book Source.
2. K K Aggarwal, Yogesh Singh - Software Engineering,Third Edition, New Age International Publications.

References :

1. Roger S Pressman - Software Engineering: A Practitioner's Approach, Sixth Edition, McGraw-Hill Higher Education.
2. Ian Sommerville - Software Engineering , Seventh Edition, Pearson Education.
3. Pankaj Jalote - An Integrated approach to Software Engineering, Second Edition, Narosa Publishing Company.

CA4CRT12 - Linux Administration (Core)

Theory:4 hrs. per week

Credits:4

Unit-1 (12 hrs.)

Overview of Linux : What is Linux, Linux's root in Unix, Common Linux Features, advantage of Linux, Overview of Unix and Linux architectures, Linux files system, hardware requirements for Linux, Linux standard directories. Commands for files and directories cd, ls, cp, rm, mkdir, rmdir, pwd, file, more, less, Creating and viewing files using cat, file comparisons.

Unit 2 (15 hrs.)

Essential Linux commands: Processes in Linux, process fundamentals, connecting processes with pipes, redirecting input/output, Background processing, managing multiple processes, process scheduling – (at, batch), nohup command, kill, ps, who, find, sort, touch, file, file processing commands - wc, cut, paste etc Mathematical commands - expr, factor etc. Creating and editing files with vi editor.

Unit 3 (15 hrs.)

Shell programming - Basics of shell programming, various types of shell available in Linux, comparisons between various shells, shell programming in bash.Conditional and looping statements, case

statement, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automating system tasks

Unit-4 (18 hrs.)

System administration - Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disabling of users accounts, creating and mounting file system, checking and monitoring system performance - file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel, installing and removing packages with rpm command.

Unit-5: (12 hrs.)

Simple filter commands: pr, head, tail, cut, sort, uniq, tr - Filter using regular expression grep, egrep, sed
Understanding various Servers :DHCP, DNS, Squid, Apache, Telnet, FTP,Samba.

Book of study :

1. Cristopher Negus - Red Hat Linux Bible, Wiley Dreamtech India 2005 edition.
2. Yeswant Kanethkar - UNIX Shell Programming, First edition, BPB.

References :

1. Official Red Hat Linux Users guide by Redhat, Wiley Dreamtech India
2. Graham Glass & King Ables - UNIX for programmers and users, Third Edition, Pearson Education.
3. Neil Mathew & Richard Stones - Beginning Linux Programming, Fourth edition, Wiley Dreamtech India.

CA4CRT13 -Web Programming Using PHP

Theory:3 hrs. per week

Credits:3

Unit 1 (8 hrs.)

Introduction to web, WWW architecture, Fundamentals of HTML, text formatting tags, marquee, inserting images, links, lists, creating tables, frames, working with form elements.

Unit 2 (10 hrs.)

CSS introduction, <link> and <style> elements, CSS properties, Controlling Fonts, Text formatting, Text- pseudo classes, Selectors, Links, Backgrounds, lists

Introduction to Java Script, Java Script variables, operators, decision control statements, looping, functions, arrays, events, popup boxes-alert, prompt, conform box, built-in objects, writing JavaScript, form validation

Unit 3 (10 hrs.)

Introduction to PHP, server side scripting, role of web server software, php comments, variables, echo and print, PHP operators, data types, branching statements, loops, arrays

Unit 4 (12 hrs.)

PHP functions, PHP form, Passing information between pages, \$_GET, \$_POST, \$_REQUEST. String functions, include and require, session and cookie management, error handling in PHP, Object Oriented Programming using PHP

Unit 5 (14 hrs.)

Introduction to MySQL, datatypes, SQL commands-CREATE, UPDATE, INSERT, DELETE, SELECT, PHP functions for MySQL connectivity and operation- mysql_connect, mysql_select_db, mysql_query, mysql_fetch_row, mysql_fetch_array, mysql_result, mysql_list_fields, mysql_num_fields, insertion, updation and deletion of data using PHP, displaying data from MySQL in webpage.

Book of Study:

1. Dave W Mercer, Allan Kent, Steven D Nowicki, David Mercer, Dan Squier, Wankyu Choi - "Beginning PHP", Wiley Publishing, Inc
2. Ivan Bayross - "HTML, DHTML, JavaScript, Pearl & CGI ", Fourth Revised Edition, BPB Publication.
3. "Programming PHP",Rasmus Lerdorf and Kevin Tatore, Shroff Publishers & Distributors Pvt. Ltd
4. "Beginning PHP", Dave W Mercer, Allan Kent, Steven D Nowicki, David Mercer, Dan Squier, Wankyu Choi, Wiley Publishing, Inc

CA4CRP04 - Software Lab IV (Core)

Software Lab: 6 hrs. per week

Credits:2

I. Linux (2 hrs. per week)

Sl.No	Topic and Details
1	Getting started –Commands
2	The Linux Architecture and command usage – Commands, General-purpose utilities
3	The File system –Commands
4	Process related commands
5	Handling ordinary files, Basic file attributes
6	The vi editor
7	Simple Filters, Filters using regular expressions-use of grep command
8	Introduction to shell concept and writing shell script
9	Introduction to shell concept and writing shell script, Essential Shell Programming
10	User management, monitoring system performance, disk usage etc.

II. Web Programming using PHP (4 hrs. per week)

1. Creating programs based on HTML
2. Creating Java script based programs
3. Creating simple programs based on PHP
4. Programs using PHP functions
5. Programs based on MY SQL

Scheme of Evaluation for software lab IV external is as follows:

(There will be two questions; the first from LINUX and second from PHP)

Division of Marks (Practical - 3 hours External)

First program - questions from LINUX **- 25 marks**

1. Logic – 10 marks

2. Successful compilation – 8 marks

3. Result – 7 marks

Second program – questions from PHP **- 35 marks**

1. Logic – 15 marks

2. Successful compilation – 15 marks

3. Result – 5 marks

Viva Voce **- 10 marks**

Lab Record **- 10 marks**

(LINUX -Minimum of 10 Programs

PHP -Minimum of 15 Programs)

Total Marks - 80 marks

BCA - SEMESTER V

CA5CRT14 : Computer Networks (Core)

Theory:3 hrs. per week

Credits:4

Unit 1: (10 hrs.)

Introduction to Networks, Data and signals-analog and digital, periodic analog signals, digital signals, bit rate, baud rate, bandwidth. Transmission impairments- attenuation, distortion and noise.

Data communication protocols and standards, Network models - OSI model-layers and their functions. TCP/IP protocol suite.

Unit 2: (10 hrs.)

Bandwidth utilization Multiplexing: FDM, TDM, spread spectrum.

Transmission Media- guided media and unguided media.

Switching: message, Circuit and packet switched networks, datagram networks, virtual- circuit networks.

Unit 3: (12 hrs.)

Data link layer: Error Detection and Correction, Framing, flow and error control, Protocols - Noiseless channels (Simplest, Stop and Wait) and Noisy channels (Stop and Wait and Piggy Backing).

Multiple Access Protocols. Random Access-ALOHA, CSMA. Wired LANs-IEEE standards, wireless LANs-Bluetooth, Cellular Telephony

Unit 4: (12 hrs.)

Network layer and Transport layer: Repeaters, Bridges, Gateways and routers. Logical addressing – IPV4 and IPV6 addressing, Internet protocol - IPV4 and IPV6. Connectionless and Connection Oriented Services: UDP and TCP. Congestion Control, Quality of Service.

Unit 5: (10 hrs.)

Application layer: HTTP, FTP, SMTP, DNS. Network security: Common Threats- Firewalls (advantages and disadvantages), Cryptography.

Book of study:

1. B. A. Forouzan - Data communication and Networking, Fourth edition-,TMH
2. Andrew S Tanenbaum - Computer Networks ,Fourth Edition, Prentice Hall of India.

CA5CRT15 - IT & Environment (Core)

Theory:4 hrs. per week

Credits:4

Unit 1 : (18 hrs.)

Multidisciplinary nature of environmental studies : Definition, scope and importance, Need for public awareness. **(2 hrs)**

Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. a) **Forest resources**: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) **Water resources**: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) **Mineral resources**: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) **Food resources**: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) **Energy resources**: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, Case studies. f) **Land resources**: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of individual in conservation of natural resources. Equitable use of resources for sustainable life styles. **(10hrs)**

Ecosystems : Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids., Introduction, types, characteristic features, structure and function of the given ecosystem:- Forest ecosystem

(6 hrs)

Unit 2: (26 hrs)

Biodiversity and its conservation: Introduction, Biogeographical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values., India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India

(8 hrs)

Environmental Pollution :Definition, Causes, effects and control measures of: - Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste Management: Causes, effects and control measures of urban and industrial wastes., Role of an individual in prevention of pollution, Pollution case studies, Disaster management: floods, earthquake, cyclone and landslides. **(8 hrs)**

Social Issues and the Environment :Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people: its problems and concerns,

Case studies, Environmental ethics: Issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion , nuclear accidents and holocaust, Case studies, Consumerism and waste products, Environment Protection Act , Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness. (10hrs)

Unit 3: (10 hrs.)

Internet as a knowledge repository, academic search techniques, creating cyber presence. Academic websites, open access initiatives, open access publishing models, Introduction to use of IT in teaching and learning -Educational software, Academic services-INFLIBNET, NPTEL, NICNET, BRNET . (10hrs)

Unit 4: (10 hrs.)

IT & Society- issues and concerns- digital divide, IT & development, the free software movement , IT industry: new opportunities and new threats, software piracy, cyber ethics, cyber crime, cyber threats, cyber security, privacy issues, cyber laws, cyber addictions, information overload, health issues- guide lines for proper usage of computers, internet and mobile phones. e-wastes and green computing, impact of IT on language & culture-localization issues- Unicode- IT and regional languages, Green Computing Concept. (10hrs)

Unit 5: (8 hrs.)

Human Rights– An Introduction to Human Rights, Meaning, concept and development, Three Generations of Human Rights (Civil and Political Rights; Economic, Social and Cultural Rights).

Human Rights and United Nations – contributions, main human rights related organs - UNESCO, UNICEF, WHO, ILO, Declarations for women and children, Universal Declaration of Human Rights. **Human Rights in India** – Fundamental rights and Indian Constitution, Rights for children and women, Scheduled Castes, Scheduled Tribes, Other Backward Castes and Minorities

Environment and Human Rights - Right to Clean Environment and Public Safety: Issues of Industrial Pollution, Prevention, Rehabilitation and Safety Aspect of New Technologies such as Chemical and Nuclear Technologies, Issues of Waste Disposal, Protection of Environment **Conservation of natural resources and human rights:** Reports, Case studies and policy formulation. Conservation issues of western ghats- mention Gadgil committee report, Kasthurirengan report. Over exploitation of ground water resources, marine fisheries, sand mining etc. (8 Hrs)

Internal: Field study

- Visit to a local area to document environmental grassland/ hill /mountain
- Visit a local polluted site – Urban/Rural/Industrial/Agricultural Study of common plants, insects, birds etc

- Study of simple ecosystem-pond, river, hill slopes, etc

(Field work Equal to 5 lecture hours)

References:

1. "Technology in Action" Alan Evans, Kendall Martin, Mary Anne Poatsy, Pearson
2. Bharucha Erach, Text Book of Environmental Studies for undergraduate Courses. University Press, IInd Edition 2013 (TB)
3. Clark.R.S., Marine Pollution, Clarendon Press Oxford (Ref)
4. Cunningham, W.P.Cooper, T.H.Gorhani, E & Hepworth, M.T.2001 Environmental Encyclopedia, Jaico Publ. House. Mumbai. 1196p .(Ref)
5. Dc A.K.Environmental Chemistry, Wiley Eastern Ltd.(Ref)
6. Down to Earth, Centre for Science and Environment (Ref)
7. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment, Cambridge University Press 1140pb (Ref)
8. Jadhav.H & Bhosale.V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284p (Ref)
9. Mekinney, M.L & Schock.R.M. 1996 Environmental Science Systems & Solutions. Web enhanced edition 639p (Ref)
10. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. (TB)
11. Odum.E.P 1971. Fundamentals of Ecology. W.B. Saunders Co. USA 574p (Ref)
12. Rao.M.N & Datta.A.K. 1987 Waste Water treatment Oxford & IBII Publication Co.Pvt.Ltd.345p (Ref)
13. Rajagopalan. R, Environmental Studies from crisis and cure, Oxford University Press, Published: 2016 (TB)
14. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut (Ref)
15. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (Ref)
16. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Stadarnds, Vol I and II, Enviro Media (Ref)
17. Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (Ref)

18. Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p
(Ref)

19. M-Magazine, R-Reference TB- Text Book

CA5CRT16 – Java Programming using Linux (Core)

Theory:3 hrs. per week

Credits:3

UNIT 1 (10 hrs.)

Concepts of Object oriented programming, Benefits of OOP, Features of java. Java environment, java tokens, Constant, variables, data types, operators, Control Statements-branching statements, looping statements, jump statements, labeled loops.

UNIT 2 (10 hrs.)

Defining a Class, Fields declaration, Method declaration, Creating object, Accessing class members, method overloading, Constructors, constructor overloading, super keyword, static Members, Inheritance, overriding methods, dynamic method dispatch, final(variables, methods and classes), abstract methods and classes, interfaces, visibility control.

UNIT 3 (12 hrs.)

Arrays- One dimensional arrays, declaration, creation, initialization of arrays, two dimensional arrays, String class. Packages: - java API packages overview (lang, util, io, awt, swing, applet), user defined packages-creating packages, using packages

Exception Handling Techniques-try-catch-throw-throws-finally -Multithreading- creation of multithreaded program-Thread class-Runnable interface, Thread life cycle.

UNIT 4 (10 hrs.)

Event Handling-Delegation Event Model-Event Classes-Sources of Events-Event Listeners- Event classes- Swing- architecture, components of swing- JLabel, JButton, JCheckBox, JRadioButton, JList, JComboBox, JTextField, JText Area, JPanel, JFrame, Layout Managers(Flow Layout, Grid Layout, Card Layout, Border Layout, Box Layout, Null Layout).

UNIT 5 (10 hrs.)

Applet Fundamentals -applet tag, applet life cycle, passing parameters to applets. Working with graphics -Line, Rectangle, Oval, Arc, color setting. JDBC architecture- JDBC connection, JDBC statement object, JDBC drivers.

Book of study :

1. E. Balagurusamy- Programming with Java , Third Edition, McGraw Hill Companies.
2. K. Somasundaram - PROGRAMMING IN JAVA2, First Edition, Jaico Publishing House.

Reference:

1. Patrick Naughton - Java2 The Complete Reference, Seventh Edition:
2. Cay S Horstmann & Gary Cornell - Core Java Volume 1- Fundamentals, Eighth edition.
3. Java 6 Programming Black Book 2007 Edition, Dreamtech press.

CA5CRP05 : Software Lab V (core)

Software Lab: 5 hrs. per week

Credits: 2

Syllabus

Part I. Applet, JDBC connection and swing based Programs

Part II (using class and read inputs from keyboard)

Java Programs: Method Overloading- Method Overriding-inheritance-abstract class, interfaces- packages- Exception Handling-Multithreading

Scheme of Evaluation for software lab V external is as follows:

(There will be two questions; the first from Part I and second from Part II)

Division of Marks (Practical - 3 hours External)

First program - questions from Part I **- 25 marks**

1. Logic – 10 marks
2. Successful compilation – 8 marks
3. Result – 7 marks

Second program – questions from Part II **- 35 marks**

- 1. Logic – 20 marks
- 2. Successful compilation – 10 marks
- 3. Result – 5 marks

Viva Voce - 10 marks

Lab Record - 10 marks

(Minimum of 25 Programs)

Total Marks - 80 marks

CA5CRP06 : Software Development Lab I (core)

Software Development Lab: 6 hrs. per week

Credits: 2

Mini project can be a small complete application project, to make the student confident in designing a system based on Software engineering course. The internal and external evaluation is to be done with the project demonstration and presentation, viva and modification. It must be done in the college lab under the guidance of a faculty.

Scheme of Evaluation for Software Development Lab I external is as follows:

Division of Marks (Software Development Lab I)

- Project demonstration and Presentation - 25 marks
- Modification - 15 marks
- Viva Voce - 15 marks
- Project report with proper content and binding - 25 marks
- Total Marks - 80 marks**

OPEN COURSES

CA5OPT01 -Informatics and Cyber Ethics

Theory:4 hrs. per week, Credits:4

Unit I (12 hrs.)

The Internet, TCP/IP, IP Addressing, Client Server Communication, Intranet, WWW, Web Browser and Web Server, Hyperlinks, URLs, Electronic mail.

Unit II (16 hrs.)

Internet as a knowledge repository, academic search techniques, creating cyber presence. Academic websites, open access initiatives, opens access publishing models, Introduction to use of IT in teaching and learning -Educational software, Academic services–INFLIBNET, NPTEL, NICNET, BRNET.

Unit III (16 hrs.)

Introduction to purchase of technology, License, Guarantee, Warranty, Basic concepts of IPR, copyrights and patents, plagiarism. IT & development, the free software movement

Unit IV (14 hrs.)

Cyber space, information overload, cyber ethics, cyber addictions, cybercrimes– categories –person, property, Government–types-stalking, harassment, threats, security & privacy issues.

Unit V(14 hrs.)

Cyber Addiction, Information Overload, Health Issues, e-Waste and Green computing impact of IT on language & culture-localization issues- Unicode- IT and regional languages e-Governance in India, IT for National Integration, Role of IT.

Book of Study:

1. Alan Evans, Kendall Martin, Mary Anne Poatsy - “Technology in Action”, Pearson

References:

1. Dinesh Maidasani “Learning Computer Fundamentals, MS Office and Internet & Web Technology”, Firewall Media, Lakshmi Publications.
2. V Rajaraman - “Introduction to Information Technology”, Prentice- Hall of India.
3. Barkhs and U. Rama Mohan - HTML Black Book 3. “Cyber Law Crimes”, Asia Law House, New Edition
4. Peter Nortons- Introduction to Computers, Sixth Edition, Published by Tata McGraw Hill

CA5OPT02 - Computer Fundamentals, Internet & MS Office

Theory:4 hrs. per week

Credits:4

Unit I (12 hrs.)

Computer Fundamentals: History, Generations, Classifications, Operating Systems, Types of Networks

Unit II (12 hrs.)

The Internet, TCP/IP, IP Addressing, Client Server Communication, Intranet, WWW, Web Browser and Web Server, Hyperlinks, URLs, Electronic Email

Unit III (14 hrs.)

Word processing: Introduction, Microsoft Word, Basic Menus, Formatting the text & paragraph, Working with Index

Unit IV (18 hrs.)

Spread Sheet: Introduction, Microsoft Excel, Basic Menus, Formulas, Basic functions, Charts and Graphs.

Unit V (16 hrs.)

Microsoft PowerPoint: Introduction, Basic Menus, Template, Slide Basics, Charts, Adding Multimedia & Animation.

Book of Study:

1. Dinesh Maidasani, Firewall Media - “Learning Computer Fundamentals, MS Office and Internet & WebTechnology”, , Lakshmi Publications.

References:

1. Harley Hahn - “Internet Complete Reference”, , Second Edition, Tata McGraw Hill Education
2. Gary B. Shelly, Misty E. Vermaat - “Microsoft Office 2010: Advanced” , CENGAGE Learning 2010

CA6CRT17 - CLOUD COMPUTING (Core)

Theory:4 hrs. per week

Credits:4

Unit 1: (14 hrs.)

Introduction: Cloud Computing at a Glance, Historical Developments, Building Cloud Computing Environments, Computing Platforms and Technologies, Principles of Parallel and Distributed Computing: Eras of Computing, Parallel vs. Distributed Computing, Elements of Parallel Computing, Elements of Distributed Computing.

Unit 2: (14 hrs.)

Virtualization: Introduction, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples.

Unit 3: (14 hrs.)

Cloud Computing Architecture :Introduction, Cloud Reference Model, Types of Clouds, Economics of the Cloud, Open Challenges.

Unit 4: (16 hrs.)

Aneka: Cloud Application Platform: Framework Overview, Anatomy of the Aneka Container, Building Aneka Clouds, Cloud Programming and Management, Data Intensive Computing: Map-Reduce Programming - What is Data-Intensive Computing?, Technologies for Data-Intensive Computing, Aneka MapReduce Programming.

Unit 5: (16 hrs.)

Cloud Platforms in Industry: Amazon Web Services, Google AppEngine, Microsoft Azure, Cloud Applications: Scientific Applications, Business and Consumer Applications.

Book of Study:

1. Rajkumar Buyya, Christian Vecchiola, S ThamaraiSelvi- Mastering Cloud Computing, Tata McGraw Hill Publications.

References:

1. Kumar Saurabha, “Cloud Computing “ Wiley Publication Krutz ,Vines “Cloud Security”.
Wiley Publication.
2. A Srinivasan & J. Suresh “ Cloud Computing : A Practical Approach for learning and
Implementation “ , First edition ,Pearson

CA6CRT18 -Mobile Application Development – Android (Core)

Theory:4 hrs. per week

Credits:4

Unit 1 (10 hrs.)

Introduction to Android, Android Versions, Android Activity, Android Features and Architecture, Java JDK, Android SDK, Android Development Tools, Android Virtual Devices,

Emulators, Dalvik Virtual Machine, Layouts – Linear, Absolute, Frame, Relative and Table.

Unit 2 (16 hrs.)

Android User Interface- Fundamental UI design , User interface with View- Text View, Buttons, Image Button, Edit Text, Check Box, Toggle Button, Radio Button and Radio Group, Progress Bar, Autocomplete Text View, Spinner, List View, Grid View, Image View, Scroll View, Custom Toast Alert and Time and Date Picker.

Unit 3 (14 hrs.)

Activity - Introduction, Intent, Intent_filter, Activity Life Cycle, Broadcast Life Cycle, Services, multimedia-Android System Architecture, Play Audio and Video, Text to Speech.

Unit 4 (16 hrs.)

SQLite Database in Android- Introduction to SQLite Database, Creation and Connection of the

Database, Extracting values from Cursors, Transactions, Telephoning and Messaging-SMS Telephony, Sending SMS, Receiving SMS, Wi-Fi Activity.

Unit 5 (16 hrs.)

Introduction to JSON and XML, Use of JSON, Syntax and Rule of JSON, JSON Name, JSON Values, JSON Objects, JSON Arrays, Parsing JSON and XML.
Google Play services, Location services, Maps

Book of Study:

1. Prasanna Kumar Dixit - ANDROID, Vikas Publishing House.
2. Anubhav Pradhan, Anil Deshpande, Composing Mobile Apps using Android, Wiley India Pvt.Ltd,2014

References:

1. Kevin Grant and Chris Haseman, Beginning Android Programming – Develop and Design, Pearson.

Software Lab Work (Four hours per week)

Module II

Installation and configuration of Eclipse and Development Tools

Module III

Creating simple apps using Interface Tools

Module IV

Creating Andoid Apps using SQLite

Module V

Familiarizing with JSON and XML, Creation and distribution of Android Apps.

Elective papers (core)

CA6ELT01- DATA MINING (Core)

Theory:4 hrs. per week

Credits:4

Unit 1: (12 hrs.)

Introduction Data Mining, Data Ware House, Transactional Databases, Data Mining Functionalities Characterization and Discrimination, Mining frequent patterns, Association and correlation, Classification and Prediction, Cluster Analysis, Classification of Data Mining Systems, Data Mining Task Primitive, Integration of Data Mining systems, Major issues in Data Mining, Data integration and transformation, Data reduction, Data discretization.

Unit 2: (12 hrs.)

Data Warehouse and OLAP technology Data Warehouse, Multidimensional data Model, Data warehouse architecture, Data Warehouse implementation, OLAP, Data Warehouse and data mining.

Unit 3: (18 hrs.)

Association Rules and Classification Concepts Efficient and Scalable Frequent item set Mining methods, Mining various kind of association rules, from association mining to Co-relation analysis, Classification and prediction, Issues, Classification by Decision tree induction, Bayesian Classification, Rule-based classification, Support Vector Machines, Learning from your neighbors, Prediction.

Unit 4: (18 hrs.)

Cluster Analysis Definition, Types of data in cluster analysis, A categorization major Clustering methods- Partitioning methods, K-means and k-medoids, from k-medoids to CLARANS, Hierarchical methods, Density based methods.

Unit 5: (12 hrs.)

Mining Complex Data Spatial Data Mining, Multimedia Data Mining, Text Mining and Mining WWW.

Book of study:

1. Jiawei Han and Micheline Kamber - Data Mining - Concepts and Techniques, Second Edition, Elsevier, 2006

Reference:

1. Witten and Frank - Data Mining Practical Machine Learning Tools and Techniques, Second Edition, Elsevier, 2005
2. Soman, Divakar and Ajay, Data Mining Theory and Practice, PHI, 2006
3. Margaret H Dunham- Data Mining –Introductory and Advanced Topics, Fourth Edition, Person 2006

CA6ELT02 -Digital Image Processing

Theory:4 hrs. per week

Credits:4

Unit 1: (10 hrs.)

Digital Image Fundamentals

Image, Digital Image, Digital image processing-definitions, Examples of fields that use Digital Image Processing, Fundamental steps in Digital Image Processing, Components of Image processing system.

Unit 2 : (14 hrs.)

Elements of visual perception

Elements of visual perception- Image Formation, Brightness adaptation and Discrimination, Image sampling and quantization- basic concepts, spatial and Intensity resolution, Basic relationship among Pixels.

Unit 3: (16 hrs.)

Image Enhancement in Spatial and Frequency Domain

Intensity Transformation and spatial Filtering Basics, Intensity transformation functions- Image Negatives, Log Transformations, Power Law Transformations, Histogram Processing, Spatial filtering- correlation and convolution; Fourier transform and frequency domain.

Unit 4: (15 hrs.)

Morphological Image Processing

Introduction, basis of set theory, Dilation, Erosion, Structuring elements, Opening and Closing, Hit or miss transformation.

Unit 5: (17 hrs.)

Image Segmentation

Point, Line, Edge detection-detection of isolated points, Basic edge detection- Gradient operators; Pixel based approach-Basics of intensity thresholding, Basic global thresholding; Region based segmentation-region growing, region splitting and merging.

Book of Study:

1. Rafael C. Gonzalez, Richard E. Woods- Digital Image Processing, Third Edition, Pearson.

References:

1. Anil K Jain- Fundamentals of Digital Image Processing , Pearson Education.
2. Er. Rishabh Anand, Digital Image Processing, MEDTEC Publications.

CA6ELT03- Soft Computing Techniques

Theory:4 hrs. per week

Credits:4

Unit 1 (14 hrs.)

Soft Computing, Difference between soft computing and hard computing. **Neural Networks:** Basic concepts of Neural Networks, Human Brain, Artificial Neuron model, Activation functions, Neural network architecture, Single layer and multilayer feedforward networks, Recurrent networks, Neural network characteristics, Learning methods, Rosenblatt's perceptron, Perceptron and linearly separable tasks, XOR problem, Neural network applications.

Unit 2 : (14 hrs.)

Back Propagation Networks: Architecture- perceptron model, solution, single layer artificial neural network, multilayer perception model, back propagation learning- input layer computation, hidden layer computation, output layer computation, calculation of error, Training of neural network, effect of learning rate coefficient, Back propagation algorithm.

Unit 3: (15 hrs.)

Fuzzy Set Theory: Fuzzy versus crisp, Crisp sets, Operations on crisp sets, Properties of crisp sets, Partition and covering, Fuzzy sets, Membership functions, Basic fuzzy set operations, Properties of fuzzy sets, Crisp relations, Operations on crisp relations, Fuzzy relations, Fuzzy cartesian product, Operations on fuzzy relations.

Unit 4 : (15 hrs.)

Fuzzy Systems: Crisp logic, Laws of propositional logic, Inference in propositional logic, Predicate logic, Interpretations of predicate logic formula, Inference in predicate logic, Fuzzy logic, Fuzzy propositions, Fuzzy connectives, Fuzzy quantifiers, Fuzzy inference, Fuzzy rule based system, Defuzzification methods, Applications.

Unit 5: (14 hrs.)

Genetic Algorithm: History, Basic concepts, Biological background, Creation of offsprings, Encoding, Fitness function, Reproduction, **Genetic Modeling:**Crossover, Inversion and deletion, Mutation, Bit-wise operators used in genetic algorithm, Generational cycle, Convergence of a genetic algorithm, Issues and benefits of GA, Application domains.

Book of study:

1. S. Rajasekaran and G.A VijayalakshmiPai- Neural Networks, Fuzzy Logic, and Genetic Algorithms Synthesis and Applications, Prentice-Hall of India Pvt.Ltd ,2004.

References:

1. S. N. Sivanandan and S. N. Deepa, Principles of Soft Computing, Wiley India 2nd Ed, 2011.
2. B K Tripathy, J. Anuradha, Soft computing Advances and Applications, Cengage Learning.
3. B Yegnanarayana, Prentice, Artificial Neural Network, Hall of India Pvt.Ltd ,2012.

CA6CRP07 : Seminar (core)

Seminar Presentation: 2 hrs. per week

Credits: 2

Each student can choose a latest topic of current day interest in the areas of Computer Science / Information Technology and present a seminar presentation using appropriate presentation media. A seminar presentation report in bound form in the pattern of a complete technical report (with contents page, well structured presentation, references etc.) should be submitted. There will not be any external evaluation for Seminar Presentation.

Scheme of Evaluation of Seminar Presentation (core) for INTERNAL is as follows:

Division of Marks

Seminar Presentation Internal (100 marks)

Presentation	- 40 marks
Discussion(Questions and Answers)	- 30 marks
Documentation	10 marks
Seminar report with proper Content and Binding	- 20 marks
Total Marks	-100 marks

CA6CRP08 : Software Development Lab II (Main Project) (Core)

Software development lab: 7 hrs. per week

Credits: 3

Individual project.

The project topic shall be chosen from areas of current day interest using latest packages / languages running on appropriate platforms (Except the tools used in software development-I), so that the student can be trained to meet the requirements of the Industry. A project report should be submitted in hard bound complete in all aspects. For internal evaluation, the progress of the student shall be systematically assessed through various stages of evaluation at periodic intervals.

Scheme of Evaluation for Software Development Lab II external is as follows:

Division of Marks (Software Development Lab II)

Project demonstration and Presentation	- 40 marks
Viva related to project	- 20 marks
Project report with proper content and binding	-20 marks
Total Marks	- 80marks

CA6VVT01 –VIVA VOCE (Core)

Credit :1

Scheme of Evaluation of Viva voce (core) for External is as follows:

Each student should attend a course viva voce based on syllabus from semester I to semester IV.

Total Marks – 100 marks

Consolidated Scheme – I to VI Semesters of BCA

Sem	Title with Course Code	Course Category	Hours per week	Credit	Marks		
					Intl	Extl	Total
I	English-I	Common	5	4	20	80	100
	Mathematics	Complementary	4	4	20	80	100
	Basic Statistics	Complementary	4	4	20	80	100
	CA1CRT01 -Computer Fundamentals and Digital Principles	Core	4	4	20	80	100
	CA1CRT02-Methodology of Programming and C Language	Core	4	3	20	80	100
	CA1CRP01-Software Lab I (Core)	Core	4	2	20	80	100
II	English-II	Common	5	4	20	80	100
	Discrete Mathematics	Complementary	4	4	20	80	100
	CA2CRT03 -Data Base Management Systems	Core	4	3	20	80	100
	CA2CRT04-Computer Organization and Architecture	Core	4	4	20	80	100
	CA2CRT05-Object oriented programming using C++	Core	3	4	20	80	100
	CA2CRP02-Software Lab- II	Core	5	2	20	80	100
III	Advanced Statistical Methods	Complementary	4	4	20	80	100
	CA3CRT06-Computer Graphics	Core	4	4	20	80	100
	CA3CRT07-Microprocessor and PC Hardware	Core	3	4	20	80	100
	CA3CRT08-Operating Systems	Core	4	4	20	80	100
	CA3CRT09-Data Structure using C++	Core	4	3	20	80	100
	CA3CRP03-Software Lab III	Core	6	2	20	80	100
IV	Operational Research	Complementary	4	4	20	80	100
	CA4CRT10-Design and Analysis of Algorithms	Core	4	4	20	80	100
	CA4CRT11- System Analysis & Software Engineering	Core	4	4	20	80	100
	CA4CRT12-Linux Administration	Core	4	4	20	80	100
	CA4CRT13-Web Programming using PHP	Core	3	3	20	80	100
	CA4CRP04-Software Lab IV	Core	6	2	20	80	100

V	CA5CRT14-Computer Networks	Core	3	4	20	80	100
	CA5CRT15-IT and Environment	Core	4	4	20	80	100
	CA5CRT16-Java Programming using Linux	Core	3	3	20	80	100
	CA5OPT-- Open Course	Core	4	3	20	80	100
	CA5CRP05 -Software Lab V	Core	5	2	20	80	100
	CA5CRP06-Software Development Lab I (Mini Project in PHP)	Core	6	2	20	80	100
VI	CA6CRT17 -Cloud Computing	Core	4	4	20	80	100
	CA6CRT18 -Mobile Application development- Android	Core	4	4	20	80	100
	CA6PET-- -Elective	Core	4	4	20	80	100
	CA6CRP07 –Software Lab VI & Seminar	Core	6	2	100	-	100
	CA6CRP08 -Software Development Lab II (Main Project)	Core	7	3	20	80	100
	CA6VVT01-Viva Voce	Core		1	-	100	100

Open Course(OP): CA5OPT01 : Informatics and Cyber Ethics, CA5OPT02 : Computer Fundamentals, Internet & MS Office.

Electives (PE): CA6PET01: Data Mining, CA6PET02: Digital Image Processing, CA6PET03: Soft Computing Techniques.