

CORE COURSE XVII: 6B17BCA DESIGN AND ANALYSIS OF ALGORITHM

| SEMESTER | COURSE CODE | HOURS PER WEEK | CREDIT | EXAM HRS |
|----------|-------------|-------------------|--------|-------------|
| VI | 6B17BCA | 4 | 4 | 3 |

COURSE OUTCOME

CO1: Knowledge about important computational problems.

CO2: Knowledge to design the algorithm.

CO3: Knowledge to analyze a given algorithm.

CO4: Acquire knowledge to analyze algorithm control structures and solving recurrences.

Unit I:

Algorithm Design: Introduction, Steps in developing algorithm, Methods of specifying an algorithm, Decisions prior to designing based on the capabilities of the device, based on the nature of solutions, based on the most suitable data structures. Model of Computation: RAM model and PRAM model.

(10 Hrs)

Unit II:

Important Problem Types: Sorting, Searching, String matching, Graph problems, Combinatorial problems, Geometric problems, Numerical problems. Basic Technique for Design of Efficient Algorithm: Brute Force approach, Divide-and-Conquer approach, Greedy approach, Dynamic Programming, Backtracking, Branch-and-Bound technique.

(20 Hrs)

Unit III:

Algorithm Analysis: Importance of algorithm analysis, Time and Space Complexity. Growth of Functions: Asymptotic notations, Cost estimation based on key operations- big Oh, big Omega, little Oh, little Omega and Theta notations.

(8 Hrs)

Unit IV:

Analysing Algorithm Control Structures, Solving Recurrences: Substitution Method, Iteration Method, The Recursion Tree Method, Master's Theorem. Problem Solving using Master's Theorem Case 1, Case 2 and Case 3. Best case, worst case and average case performance analysis.

(20 Hrs)

Unit V:

Study of the structure of algorithms: Strasser's algorithm, Huffman coding, Kruskal's algorithm and Prim's algorithm.

(14 Hrs)

Books for Study:

1. Pallaw, V K, Design and Analysis of Algorithms, Asian Books Private Ltd, 2012, ISBN: 8184121687.
2. Pandey H M, Design and Analysis of Algorithms, University Science Press, 2013, ISBN: 9788131803349.

Books for Reference:

1. Upadhyay N, Design and Analysis of Algorithms, SK Kataria & Sons, 2008.
2. U. Manber, Introduction to Algorithms: A Creative Approach, Addison Wesley, ISBN: 9780201003277.
3. Gilles Brassard and Paul Bratley, Fundamentals of Algorithmics, Prentice-Hall of India, ISBN: 0133350681.
4. Goodman S E and Hedetniemi, Introduction to the Design and Analysis of Algorithms, McGraw Hill, ISBN: 0070237530.
5. Horowitz E and Sahni S, Fundamentals of Computer Algorithms, Galgotia Publications Pvt. Ltd, ISBN: 8175152575.

Marks including choice:

| Unit | Marks |
|------|-------|
| 1 | 8 |
| 2 | 13 |
| 3 | 13 |
| 4 | 13 |
| 5 | 13 |

CORE COURSE XVII: 6B18BCA INTRODUCTION TO COMPILER

| SEMESTER | COURSE CODE | HOURS PER WEEK | CREDIT | EXAM HRS |
|----------|-------------|-------------------|--------|-------------|
| VI | 6B18BCA | 4 | 3 | 3 |

COURSE OUTCOME

CO1: Knowledge about Compiler

CO2: Knowledge about various phases of compiler design.

Unit I:

Introduction to compiling - definition of compiler, Classification of Compiler: Single pass, Multi pass, Load and Go. Parts of Compilation: Analysis and Synthesis. The phases of a compiler: Lexical Analyser, Syntax Analyser, Semantic Analyser, Intermediate code generator, Code optimizer, Target Program, Symbol table manager.

(15 Hrs)

Unit II:

Programming language basics - lexical analysis – role of lexical analyzer – input buffering - specification of tokens – recognition of tokens using finite automata.

(15 Hrs)

Unit III:

Syntax analysis – role of parser – error handling and recovery – definitions of parsing, top-down parsing and bottom-up parsing - context free grammars – derivations - parse tree – ambiguity – associativity and precedence of operators - writing a grammar.

(12 Hrs)

Unit IV:

Intermediate code generation – DAG – three address code – addresses and instructions – quadruples – triples – Static Simple Assignment form – types and declarations – type expressions - type equivalences – declarations – type checking – rules – type conversion.

(15 Hrs)

Unit V:

Run time environments – storage optimization – static Vs dynamic allocation – stack allocation of space - activation trees and records – calling sequences. Code generation – issues in the design of a code generator – the target language – a simple target machine model. Code optimization - the principal sources of optimization – data flow analysis – abstraction – data flow analysis schema – data flow schemas on basic blocks.

(15 Hrs)

Books for Study:

1. V Aho A, Ravi Sethi, D Ullman J, Compilers Principles, Techniques and Tools, 2nd Edition, Pearson Education Singapore Pte Ltd, ISBN: 8131721019.

Books for Reference:

1. Principles of Compiler Design by MG Durga and TG Manikumar. ISBN: 978-81-8094-161-0
2. W Appel and Andrew, Modern Compiler Implementation in C, 1st Edition, Cambridge University Press, ISBN: 817596071X.
3. Allen I Holub, Compiler Design in C, 1st Edition, PHI Learning Pvt Ltd, ISBN: 812030778X.

Marks including choice:

| Unit | Marks |
|------|-------|
| 1 | 12 |
| 2 | 12 |
| 3 | 12 |
| 4 | 12 |
| 5 | 12 |

CORE COURSE XIX: DATA COMMUNICATION & NETWORKS

| SEMESTER | COURSE CODE | HOURS PER WEEK | CREDIT | EXAM HRS |
|----------|-------------|-------------------|--------|-------------|
| VI | 6B19BCA | 3 | 3 | 3 |

COURSE OUTCOME

CO1: Understand the basics of datacommunication

CO2: Familiarize with OSI referencemodel

CO3:Familiarize students with layers of communicationmodel

CO4: Understand the concepts of networksecurity

Unit I

Introduction to data communication, important elements /components of data communication, Data transmission- Analog, Digital. Transmission media- Guided media, Unguided media. Synchronous / Asynchronous data transmission.Line configuration – Simplex, Half duplex, Duplex.Network topologies – star, Bus, ring, Mesh.Computer networks, Use, network hardware, network structure- point to point connection, multicast, broadcast, classification of networks-LAN, WAN, Man. Network software – protocol hierarchies. design issues for layers, interfaces and services- connection oriented, connection less.

(12Hrs)

Unit II:

Reference models, the OSI reference model, TCP / IP reference model. Comparison between OSI and TCP / IP models.Data Link Layer, Design issues, Services to network layer, Framing- character count, character stuffing, bit stuffing, physical layer coding violation. Error control, flow control, Elementary data link protocols- unrestricted simplexprotocol,simplexstopandwaitprotocol,simplexprotocolforanoisychannel.

(12Hrs)

Unit III:

Network layer, design issues, services to the transport layer, routing algorithms- adaptive, non-adaptive algorithms, optimality principle, dijkstras shortest path routing algorithm, flow based routing, hierarchical routing, congestion control algorithms – the leaky bucket algorithm, the token bucketalgorithm.

(10Hrs)

Unit IV

Transport layer, design issues, connection management-addressing, establishing and releasing connection, transport layer protocols- TCP,UDP

(10Hrs)

Unit V

Application layer, network security, traditional cryptography, substitution ciphers, transposition ciphers, fundamental principles, secret key algorithm, data encryption standard, DES chaining, DES breaking. Public key algorithm, RSA algorithm.

(10Hrs)

Books for Study:

1. Computer Networks, Andrew S. Tanenbaum & David J. Wetherall, Pearson.

Books for Reference:

1. Data Communication and Networking, Behrouz A. Forouzan, McGraw Hill Education.
2. Achyut S. Godbole and Atul Kahate, Data communication and Networks, 2nd Ed, McGraw Hill
3. Computer Networking: A Top-Down Approach, Kurose James F. and Ross Keith W., Pearson.
4. R. S. Rajesh, K. S. Easwara Kumar and R. Balasubramanian, Computer Networks – Fundamentals and Applications, Vikas Publishing House.

Marks including choice:

| Unit | Marks |
|------|-------|
| 1 | 12 |
| 2 | 12 |
| 3 | 12 |
| 4 | 12 |
| 5 | 12 |

**CORE COURSE XX: 6B20BCA-E01 DATA MINING AND DATA
WAREHOUSING**

| SEMESTER | COURSE CODE | HOURS PER WEEK | CREDIT | EXAM HRS |
|----------|-------------|-------------------|--------|-------------|
| VI | 6B20BCA-E01 | 3 | 3 | 3 |

COURSE OUTCOME

CO1: Understanding the importance of data mining and data warehousing.

CO2: Understand the data management aspects data preprocessing model and inference considerations, complexity considerations, post processing of discovered structures visualization and online updating

Unit I

Introduction; data warehousing – what is, Multidimensional data model, OLAP operations, warehouse schema, Data warehousing Architecture, warehouse server, Metadata, OLAP engine, data warehouse Backend Process.

(12Hrs)

Unit II

Data mining – what is, KDD vs data mining, DBMS vs data mining, DM Techniques, issues and challenges, Applications. (Case studies) *

(8 Hrs)

Unit III

Association rules – What is, Methods, a priori algorithm, partition algorithm, Pincer-search algorithm, FP-tree growth algorithm, incremental and Border algorithms, Generalized Association rule.

(12 Hrs)

Unit IV

Clustering techniques – Paradigms, Partitioning Algorithms, k – Medoid algorithms, CLARA, CLARANS, hierarchical clustering, DBSCAN, Categorical Clustering, STIRR.

(10 Hrs)

Unit V

Decision trees – what is, tree construction principles, Best split, Splitting indices, Splitting criteria, decision tree construction algorithms, CART, ID3, C4.5, CHAID. Introduction to web, spatial and temporal datamining.

(12 Hrs)

Books for Study:

1. Arun K. Pujari, Data Mining Techniques, 2nd Ed, Univeristy Press

Books for Reference:

1. Jiawei Han, Micheline Kamber and Jian Pei, Data Mining: Concepts and Techniques, 3rd Ed, Morgan Kaufmann
2. Margaret H. Dunham, Data Mining - Introductory and Advanced Topics, Pearson

Marks including choice:

| Unit | Marks |
|------|-------|
| 1 | 12 |
| 2 | 12 |
| 3 | 12 |
| 4 | 12 |
| 5 | 12 |

CORE XX: 6B20BCA-E02 NETWORK PROGRAMMING

| SEMESTER | COURSE CODE | HOURS PER WEEK | CREDIT | EXAM HRS |
|----------|-------------|-------------------|--------|-------------|
| VI | 6B20BCA-E02 | 3 | 3 | 3 |

COURSE OUTCOME

CO1: Understand basics of network programming

CO2: Understand basics of socket options

CO3: Familiarize with DNS

Unit I

Introduction –A Simple Day Time Client – Protocol Independence – ErrorHandlingA Simple - Day Time Server.The Transport Layer: TCP, UDP – TCP Connection EstablishmentandTermination–TIME_WAITState–PortNumbers– ConcurrentServersBuffer Size and Limitations – Standard Internet Services – Protocol Usage by Common InternetApplications.

(15 Hrs)

Unit II

Socket Introduction – Socket address Structures – Byte Ordering Functions – Byte Manipulation Functions – Elementary TCP Sockets – socket , connect, bind, listen, accept, fork and exec, close, getsockname and getpeername functions.

(15 Hrs)

Unit III

TCP Client/Server Example – TCP Echo Server - main(), str_echo() – TCP Echo Client - main(), str_cli() – startup – termination – Shutdown of ServerHost.

(7 Hrs)

Unit IV

Socket Options – getsockopt and setsockopt functions – Socket States –Generic Socket Options – TCP Socket Options.

(7 Hrs)

Unit V

Name and Address Conversions - DNS – gethostbyname – gethostbyaddr –

getservbyname – getservbyport – getaddrinfo – freeaddrinfo – host_serv – tcp_connect – tcp_listen functions.

(10 Hrs)

Books for Study:

1. W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, “Unix Network Programming The Sockets Networking API Volume I”, Pearson

Books for Reference:

1. Barry Nance, “Network Programming in C”, Prentice Hall

Marks including choice:

| Unit | Marks |
|------|-------|
| 1 | 12 |
| 2 | 12 |
| 3 | 12 |
| 4 | 12 |
| 5 | 12 |

CORE XX: 6B20BCA-E03DIGITAL IMAGE PROCESSING

| SEMESTER | COURSE CODE | HOURS PER WEEK | CREDIT | EXAM HRS |
|----------|-------------|-------------------|--------|-------------|
| VI | 6B20BCA-E03 | 3 | 3 | 3 |

COURSE OUTCOME

CO1: Understand geometric transformations

CO2: Understand basic of morphological image processing

Unit I:

Images – DIP components – Problems and Applications – motivation and perceptive – Operations – Imaging – electronic camera – Human Eye – 3D imaging – Depth from triangulation , time-of-flight, interferometry, shading, tomography, Sampling – quantization, Color Image representation, Volumetricdata.

(12 Hrs)

Unit II:

Images in Java – java2D API – java advanced imaging – image manipulation – storage – reading and writing images – display – printing – pixel processing – gray level andcolor enhancement – mapping – image histogram – Histogram equalization – Colour processing.

(12 Hrs)

Unit III:

Neighborhood operations – convolutions and correlation – Linear and rank filteringEdge detection – Hybrid adaptive filters – frequency domain – spatial frequency –Fourier theory – DFT – investigating spectra – image filtering –deconvolution.

(12 Hrs)

Unit IV:

Geometric operation – simple techniques – Affine transformations – Algorithm – interpolation schemes – Wrapping and morphing – segmentation – thresholding– Contextual techniques.

(12 Hrs)

Unit V:

Morphological image processing – Basic concepts – operations – Morphological filtering – Morphological algorithms – Gray scale morphology – image compression. Redundancy – Performance characterization – Lossy and lossless compression techniques – compression of moving images.

(6 Hrs)

Books for Study:

1. Nick Efford , Digital Image Processing: A Practical Introduction using Java, Addison Wesley

Books for Reference:

1. Rafael C. Gonzalez and Richard E. Woods, Digital Image Processing, 4th Ed, Pearson
2. Jähne, Bernd, Digital Image Processing, Springer

Marks including choice:

| Unit | Marks |
|------|-------|
| 1 | 12 |
| 2 | 12 |
| 3 | 12 |
| 4 | 12 |
| 5 | 12 |

CORE COURSE XX: 6B20BCA-E04CLOUD COMPUTING

| SEMESTER | COURSE CODE | HOURS PER WEEK | CREDIT | EXAM HRS |
|----------|-------------|-------------------|--------|-------------|
| VI | 6B20BCA-E04 | 3 | 3 | 3 |

COURSE OUTCOME

CO1: Understand fundamentals of cloud computing

CO2: Understand principles of parallel and distributed computing

CO3: Familiarize with Cloud Computing Architecture

Unit I

Introduction: Cloud Computing at a Glance - Historical Developments - Building Cloud Computing Environments - Computing Platforms and Technologies

(8Hrs)

Unit II

Principles of Parallel and Distributed Computing: Eras of Computing - Parallel vs. Distributed Computing - Elements of Parallel Computing - Elements of Distributed Computing - Technologies for Distributed Computing

(14 Hrs)

Unit III

Virtualization: Introduction - Characteristics of virtualized environments - Taxonomy of virtualization techniques - Virtualization and cloud computing - Pros and Cons of Virtualization - Technology examples

(12 Hrs)

Unit IV

Cloud Computing Architecture : Introduction - The cloud reference model - Types of clouds - Economics of the cloud - Open challenges

(10 Hrs)

Unit V

Cloud Platforms in Industry : Amazon Web Services - Compute Services - Storage Services - Google AppEngine - Architecture and Core Concepts - Microsoft Azure - Azure Core Concepts.

(10 Hrs)

Books for Study:

1. Mastering Cloud Computing, RajkumarBuyya, Christian Vecchiola,S.ThamaraiSelvi, Tata McGraw Hill Education Private Limited
2. Mastering Cloud Computing - Foundations and Applications Programming, RajkumarBuyya, Christian Vecchiola and S. ThamaraiSelvi,MK Publications,

Books for Reference:

1. Cloud Computing: A Practical Approach, Anthony T .Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill Edition, Fourth Reprint, 2010
2. Cloud Computing, Kumar Saurabh, WileyIndia.
3. Enterprise Cloud Computing Technology Architecture Applications, Gautam,Shroff

Marks including choice:

| Unit | Marks |
|------|-------|
| 1 | 12 |
| 2 | 12 |
| 3 | 12 |
| 4 | 12 |
| 5 | 12 |

CORE COURSE XXI: 6B21BCA LAB V: ENTERPRISE JAVA

PROGRAMMING

| SEMESTER | COURSE CODE | HOURS PER WEEK | CREDIT | EXAM HRS |
|----------|-------------|-----------------------------|--------|-------------|
| VI | 6B21BCA | V SEM 3 HRS VI SEM 2 HRS | 2 | 3 |

COURSE OUTCOME

CO1: Can write and execute simple JDBC Programs.

CO2: Can write and execute simple RMI Programs.

CO3: Can Write and execute simple servlet programs.

CO4: Can write and execute simple CORBA programs.

Sample Program List

A list of 10 Programs are given below. Each student has to complete and record all the exercises. A detailed problem statement shall be prepared by the faculty concerned.

1. JDBC program to insert, Delete and Update records into Employee table.
2. JDBC program to connect to Student table. Implement the record scrolling functions – first(), last(), next(), previous(), beforeFirst(), afterLast(), absolute() and relative().
3. JDBC program to display database metadata.
4. JDBC program to display Resultset metadata.
5. RMI program for Complex number operation.
6. RMI program for Bank operation.
7. Create an HTML form to read student details such as Roll, name, age, sex, qualification, percentage of marks etc. Write a servlet program that displays the same details.
8. Create an HTML form that reads a file name from the user. Write a servlet program that displays the contents of the file, specified by the user.
9. Session handling servlet that displays total number of visits to that page.
10. CORBA program for arithmetic operation.

CORE COURSE XXII: 6B22BCALAB VI: PYTHON PROGRAMMING

| SEMESTER | COURSE CODE | HOURS PER WEEK | CREDIT | EXAM HRS |
|----------|-------------|-----------------------------|--------|-------------|
| VI | 6B22BCA | V SEM 3 HRS VI SEM 2 HRS | 3 | 3 |

COURSE OUTCOME

Sample Program List

1. Write a program to find the largest from a list of numbers
2. Write a program to generate first n perfect numbers
3. Write a program to perform the binary search
4. Write a program to find the square root of a number using bisection search method.
5. Write a program to generate Fibonacci series using recursion
6. Write a program to find the LCM and GCD of 2 numbers
7. Write a program to perform merge sort
8. Write a program which reads the contents of a file and copy the contents to another file after changing all the letter to upper case. Exceptions should be handled.
9. Write a program to find the prime numbers in a list of numbers.
10. Write a python program to perform the following
 - a) Create table students with fields name,sex,rollno,marks
 - b) Insert some rows into the table
 - c) Update the marks of all students by adding 2 marks
 - d) Delete a student with a given rollno
 - e) Display the details of a student with a given rollno
11. Create a simple Login window using Tkinter
12. Create a plot for the mathematical function x^2 . The title of the plot and the axes should be labelled.

CORE COURSE XXIII: 6B23BCA LAB VII WEB TECHNOLOGY (LAB -VII)

| SEMESTER | COURSE CODE | HOURS PER WEEK | CREDIT | EXAM HRS |
|----------|-------------|-----------------------------|--------|-------------|
| VI | 6B23BCA | V SEM 2 HRS VI SEM 2 HRS | 2 | 3 |

COURSE OUTCOME

Guidelines

1. Follow standard coding method
2. The output of the program should be neatly formatted
3. Practice all the programs in the lab

Sample Program list

1. Develop an HTML page using all basic tags
2. Develop an HTML page to display hotel menu using all types of lists
3. Write an HTML code to insert an image into the web page. Use the attributes height, width and border. Also align some text with respect to the images. The image should have an ALT text in it.
4. Design a HTML page for the following.
 - a. Set an image as a link
 - b. Open a link in a new browser window
 - c. Jump to another part of a document (on same page)
5. Create a web page to display the maximum and minimum temperature of 5 cities using table.
6. Create a web page for your college using frames, images and hyperlink
7. Create a web page that illustrate the onMouseOver and onMouseOut event handlers.
8. Form Validation using Javascript.
 9. Create an email registration form. Give necessary validations
 10. Write a JavaScript code using arrays
 11. Develop an HTML page that accepts any mathematical expression, evaluates that expression and display the result of the evaluation

12. Write a Javascript program to display the current time
13. Write a Javascript program to print the prime numbers within a range
14. Write a Javascript program to show the working of alert ()
15. Write a JavaScript program to find the factorial of a number.
16. Form Processing using PHP
17. Form validation using PHP
18. Storing data in MYSQL using PHP

CORE COURSE XXIV: 6B24BCA PROJECT

| SEMESTER | COURSE CODE | HOURS PER WEEK | CREDIT | EXAM HRS |
|-----------------|--------------------|---------------------------|---------------|---------------------|
| VI | 6B24BCA | 5 | 4 | 3 |