

DON BOSCO ARTS & SCIENCE COLLEGE
ANGADIKADAVU

(Affiliated to Kannur University Approved by Government of Kerala)

ANGADIKADAVU P.O., IRITTY, KANNUR – 670706



COURSE PLAN

BCA

(2019 – 22)

SEMESTER – VI

ACADEMIC YEAR - (2021-22)

VI Semester BCA (2019 - 22)

SL. No.	Name of Subjects with Code	Name of the Teacher	Duty Hours per week
1.	6B17BCA Design and Analysis of Algorithm	Sindhu P M	4
2.	6B18BCA Introduction to compiler	Fincy Cyriac	4
3.	6B19BCA Data communication and Networks	Sruthi N	3
4.	6B20BCA Data Mining and Data Warehousing	Hebin Layola	3
5.	6B24BCA Project	Sruthi N	5

TIME TABLE

Day	09.50 Am - 10.45 Am	10.45 Am -11.40 Am	11.55 Am -12.50 Pm	01.40 Pm - 02.35 Pm	02.35 Pm - 03.30 Pm
1	6B19BCA Data communication and Networks	6B18BCA Introduction to compiler	6B20BCA Data Mining and Data Warehousing	6B17BCA Design and Analysis of Algorithm	6B18BCA Introduction to compiler
2	6B20BCA Data Mining and Data Warehousing	6B17BCA Design and Analysis of Algorithm	6B19BCA Data communication and Networks	6B18BCA Introduction to compiler	Lab
3	6B18BCA Introduction to compiler	6B17BCA Design and Analysis of Algorithm	6B20BCA Data Mining and Data Warehousing	6B17BCA Design and Analysis of Algorithm	6B19BCA Data communication and Networks
4	6B24BCA Project	6B24BCA Project	6B24BCA Project	6B24BCA Project	6B24BCA Project
5	6B24BCA Project	6B24BCA Project	6B24BCA Project	6B24BCA Project	6B24BCA Project

Subject Code:	6B17BCA
Subject Name:	DESIGN AND ANALYSIS OF ALGORITHM
No. of Credits:	4
No. of Contact Hours:	72
Hours per Week:	4
Name of the Teacher:	Sindhu P M

SYLLABUS

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:

Analyzing 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.

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	03-01-2022 To 08-01-2022	1	Algorithm Design: Introduction.
		2	Steps in developing algorithm.
		3	Methods of specifying an algorithm.
		4	Decisions prior to designing based on the capabilities of the device
		08 January	Second Saturday
2	10-01-2022 To 15-01-2022	5	Based on the nature of solutions
		6	Based on the most suitable data structures.
		7	Model of Computation: RAM model
		8	PRAM model
3	17-01-2022 To 22-01-2022	9	PRAM model
		10	MODULE 1 CLASS TEST
		11	Important Problem Types: Sorting.
		12	Important Problem Types: Sorting.
		13	Searching
4	24-01-2022 To 29-01-2022	14	Searching
		15	String matching
		26 January	Republic Day
		16	Graph problems
		17	Combinatorial problems
5	31-01-2022 To 05-02-2022	31 January	Don Bosco
		18	Geometric problems
		19	Numerical problems.
		20	Basic Technique for Design of Efficient Algorithm: Brute Force approach.
		21	Brute Force approach

No of Weeks	Dates	Session	Topic
6	07-02-2022 To 12-02-2022	22	Divide-and-Conquer approach
		23	Divide-and-Conquer approach
		24	Greedy approach
		25	Greedy approach
		12 February	Second Saturday
7	14-02-2022 To 19-02-2022	26	Dynamic Programming
		27	Dynamic Programming
		28	Backtracking
		29	Branch-and-Bound technique
		30	MODULE II CLASS TEST
		31	Algorithm Analysis: Importance of algorithm analysis
8	21-02-2022 To 26-02-2022		I Internal Examination
			I Internal Examination
			I Internal Examination
			I Internal Examination
			I Internal Examination
9	28-02-2022 To 05-03-2022	32	Time and Space Complexity.
		01 March	Maha Sivarathri
		33	Growth of Functions: Asymptotic notations
		34	Cost estimation based on key operations bigOh
		35	Big Omega
		36	Little Oh, little Omega
		37	Theta notations
10	07-03-2022 To 12-03-2022	38	MODULE III CLASS TEST
		39	Analyzing Algorithm Control Structures
		40	Analyzing Algorithm Control Structures
		41	Solving Recurrences: Substitution Method.
		42	Solving Recurrences: Substitution Method.
		12 March	Second Saturday
11	14-03-2022 To 19-03-2022	43	Iteration Method
		44	Iteration Method
		45	The Recursion Tree Method
		46	The Recursion Tree Method
		47	Master's Theorem.
12	21-03-2022	48	Master's Theorem.
		49	Problem Solving using Master's Theorem Case 1

Subject Code:	6B18BCA
Subject Name:	INTRODUCTION TO COMPILER
No. of Credits:	3
No. of Contact Hours:	72
Hours per Week:	4
Name of the Teacher:	Fincy Cyriac

SYLLABUS

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.

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	03-01-2022 To 08-01-2022	1	Introduction to compiling , definition of compiler
		2	Classification of Compiler: Single pass,
		3	Classification of Compiler: Multi pass,
		4	Load and Go
		08 January	Second Saturday
2	10-01-2022 To 15-01-2022	5	Parts of Compilation: Analysis
		6	Parts of Compilation: Synthesis
		7	The phases of a compiler: Lexical Analyser
		8	The phases of a compiler: Lexical Analyser
3	17-01-2022 To 22-01-2022	9	The phases of a compiler: Syntax Analyser
		10	The phases of a compiler: Semantic Analyser
		11	Intermediate code generator
		12	Code optimizer
		13	Target Program
4	24-01-2022 To 29-01-2022	14	Symbol table manager
		15	Module 1 class test
		26 January	Republic Day
		16	Programming language basics
		17	Programming language basics
5	31-01-2022 To 05-02-2022	31 January	Don Bosco
		18	Lexical analysis
		19	Lexical analysis
		20	Lexical analysis
		21	Role of lexical analyzer
6	07-02-2022 To 12-02-2022	22	Role of lexical analyzer
		23	Input buffering
		24	Input buffering
		25	Specification of tokens
		12 February	Second Saturday
7	14-02-2022 To	26	Specification of tokens
		27	Recognition of tokens using finite automata
		28	Recognition of tokens using finite automata

No of Weeks	Dates	Session	Topic
	19-02-2022	29	Recognition of tokens using finite automata
		30	Module 2 class test
		31	Syntax analysis , role of parser
8	21-02-2022 To 26-02-2022		I Internal Examination
			I Internal Examination
			I Internal Examination
			I Internal Examination
			I Internal Examination
9	28-02-2022 To 05-03-2022	32	Error handling and recovery
		01 March	Maha Sivarathri
		33	Definitions of parsing
		34	Top-down parsing
		35	Bottom-up parsing
		36	Context free grammars
10	07-03-2022 To 12-03-2022	37	Derivations
		38	Parse tree
		39	Ambiguity
		40	Associativity and precedence of operators
		41	Writing a grammar
		42	Module 3 class test
11	14-03-2022 To 19-03-2022	12 March	Second Saturday
		43	Intermediate code generation
		44	DAG
		45	Three address code
		46	Addresses and instructions
12	21-03-2022 To 26-03-2022	47	Quadruples
		48	Triples
		49	Static Simple Assignment form
		50	Types and declarations
		51	Type expressions
		52	Type equivalences
13	28-03-2022 To 02-04-2022	53	Declarations
		54	Type checking
		55	Rules
		56	Type conversion
		57	Module 4 class test
		58	Run time environments, storage optimization

Subject Code:	6B19BCA
Subject Name:	Data communication and Networks
No. of Credits:	3
No. of Contact Hours:	54
Hours per Week:	3
Name of the Teacher:	Sruthi N

SYLLABUS

Objective:

- Understand the basics of data communication
- Familiarize with OSI reference model
- To familiarize students with layers of communication model
- To introduce concepts of network security

Module I

Introduction to data communication, important elements /components of datacommunication, 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.Computernetworks, Use, network hardware, network structure- point to point connection, multicast,broadcast, classification of networks-LAN, WAN, Man. Network software – protocolhierarchies. design issues for layers, interfaces and services- connection oriented,connection less.

Module II

Reference models, the OSI reference model, TCP / IP reference model.Comparison between OSI and TCP / Ip models.Data Link Layer , Design issues, Servicesto network layer, Framing- character count, character stuffing, bit stuffing, physical layercoding violation. Error control, flow control, Elementary data link protocols-unrestrictedsimplex protocol, simplex stop and wait protocol, simplex protocol for a noisy channel.

Module III

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

Module IV

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

Module V

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

Text books

1. A S Tanenbaum . Computer Networks TMH

References

1. B Forousan, Introduction to data communication and networking

2. Data communication and Networks, Achyut S. godbole, TMH

3. Computer Networks – fundamentals and Applications, Rajesh, Easarakumar & Balasubramaian, Vikas pub.

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	03-01-2022 To 08-01-2022	1	Introduction to data communication
		2	Important elements /components of data communication, Data transmission- Analog, Digital
		3	Transmission media- Guided media, Unguided media
		08 January	Second Saturday
2	10-01-2022 To 15-01-2022	4	Guided media, Unguided media.
		5	Synchronous / Asynchronous data transmission
		6	Line configuration – Simplex, Half duplex, Duplex.
3	17-01-2022 To 22-01-2022	7	Network topologies – star, Bus, ring, Mesh
		8	Computer networks, Use, network hardware
		9	Network structure- point to point connection, multicast, broadcast
4	24-01-2022 To 29-01-2022	10	Classification of networks-LAN, WAN, Man.
		11	Network software – protocol hierarchies.
		26 January	Republic Day
		12	Design issues for layers, Interfaces and Layers
5	31-01-2022 To 05-02-2022	31 January	Don Bosco
		13	Class test for Module 1
		14	Reference models
6	07-02-2022 To 12-02-2022	15	The OSI reference model
		16	TCP / IP reference model.
		12 February	Second Saturday
7	14-02-2022 To 19-02-2022	17	Comparison between OSI and TCP / Ip models
		18	Data Link Layer , Design issues, Services to network layer
		19	Framing- character count, character stuffing
8	21-02-2022	20	I Internal Examination

No of Weeks	Dates	Session	Topic
	To 26-02-2022	21	I Internal Examination
		22	I Internal Examination
		23	I Internal Examination
		24	I Internal Examination
		25	I Internal Examination
9	28-02-2022 To 05-03-2022	26	Error control, flow control
		01 March	Maha Sivarathri
		27	Elementary data link protocols- unrestricted simplex protocol, simplex stop and wait protocol
		28	Simplex protocol for a noisy channel
10	07-03-2022 To 12-03-2022	29	Network layer, design issues
		30	Network layer, design issues
		31	Services to the transport layer
		32	Previous year question paper discussion
		33	Revision Module 1,2
		12 March	Second Saturday
11	14-03-2022 To 19-03-2022	34	Routing algorithms adaptive,non-adaptive algorithms
		35	Optimality principle
		36	Class test for Module 2
12	21-03-2022 To 26-03-2022	37	Dijkstras shortest path routing algorithm
		38	The leaky bucket algorithm
		39	The token bucket algorithm.
13	28-03-2022 To 02-04-2022	40	Transport layer, design issues
		41	Connection management, Addressing
		42	Establishing and releasing connection
14	04-04-2022 To 09-04-2022	43	Revision Module 2,3
		44	Class test Module 3
		09 April	Second Saturday
15	11-04-2022 To 16-04-2022	45	Transport layer protocols, TCP,UDP
		46	Application layer, Network security
		13 April	Easter Holidays
		14 April	Easter Holidays
		15 April	Easter Holidays
16	18-04-2022 To 23-04-2022	18 April	Easter Holidays
		47	Class test for Module 3,4
		48	Class test for Module 5

No of Weeks	Dates	Session	Topic
17	25-04-2022 To 30-04-2022	49	II Internal Examination
		50	II Internal Examination
		51	II Internal Examination
		52	II Internal Examination
		53	II Internal Examination
		54	II Internal Examination

Subject Code:	6B18BCA
Subject Name:	DATA MINING & DATA WAREHOUSING
No. of Credits:	4
No. of Contact Hours:	54
Hours per Week:	3
Name of the Teacher:	Hebin Layola

SYLLABUS

Course Objective:

- To expose to the students the introduction to data mining and data warehousing.
- To understand the data management aspects data pre processing model and inference considerations, complexity considerations, post processing of discovered structures visualization and online updating

Syllabus

Module 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.

Module II

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

Module III

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

Module IV

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

Module 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 data mioning.

Text book :

1. Data Mining Techniques, A K Pujari, University press.

Reference :

1. J. Han, M. Kamber, “Data Mining Concepts and Techniques”, Harcourt India Pvt Ltd.
2. M. Dunham, “ Data Mining : introductory and Advanced Topics”, Pearson Pub.

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	03-01-2022 To 08-01-2022	1	Introduction
		2	Data ware housing-what is.
		3	Multidimensional data model
		08 January	Second Saturday
2	10-01-2022 To 15-01-2022	4	OLAP operations
		5	Warehouse schema
		6	Data ware housing architecture
3	17-01-2022 To 22-01-2022	7	Warehouse server
		8	metadata
		9	Data warehouse backend process
4	24-01-2022 To 29-01-2022	10	Module 1 –revision
		11	Module 1-unit test
		26 January	Republic Day
		12	Module 2-what is data mining
5	31-01-2022 To 05-02-2022	31 January	Don Bosco
		13	KDD vs data mining
		14	DBMS vs datamining
6	07-02-2022 To 12-02-2022	15	DM techniques
		16	Issues and challenges
		12 February	Second Saturday
7	14-02-2022 To 19-02-2022	17	Data mining applications
		18	Case studies
		19	Module II-Exam
8	21-02-2022 To 26-02-2022	20	I Internal Examination
		21	I Internal Examination
		22	I Internal Examination
		23	I Internal Examination
		24	I Internal Examination
		25	I Internal Examination
9	28-02-2022 To 05-03-2022	26	Module III-Association rules-what is
		01 March	Maha Sivarathri
		27	Methods, Pincer search algorithm
		28	Apriori algorithm, Partition algorithm

No of Weeks	Dates	Session	Topic
10	07-03-2022 To 12-03-2022	29	FP-tree growth algorithm
		30	Partitioning algorithms, Incremental Algorithm
		31	Border algorithms, Generalized Association rule
		32	Module III-Exam
		33	Module IV-Clustering techniques, Paradigms
		12 March	Second Saturday
11	14-03-2022 To 19-03-2022	34	K-Medoid algorithms, CLARA
		35	CLARANS, Hierarchical clustering
		36	Categorical Clustering ,STIRR
12	21-03-2022 To 26-03-2022	37	Module IV-Exam
		38	Module V-Decision trees-what is
		39	Tree construction principles
13	28-03-2022 To 02-04-2022	40	Best split
		41	Splitting indices, CART
		42	Splitting criteria, Decision tree construction algorithms
14	04-04-2022 To 09-04-2022	43	C4.5, Temporal Data mining
		44	Chaid , Introduction to web
		09 April	Second Saturday
15	11-04-2022 To 16-04-2022	45	Spatial Data mining
		46	Sequence data mining
		13 April	Easter Holidays
		14 April	Easter Holidays
		15 April	Easter Holidays
		16 April	Easter Holidays
16	18-04-2022 To 23-04-2022	18 April	Easter Holidays
		47	Text mining
		48	Class Test-Module V
17	25-04-2022 To 30-04-2022	49	II Internal Examination
		50	II Internal Examination
		51	II Internal Examination
		52	II Internal Examination
		53	II Internal Examination
		54	II Internal Examination