



Rayat Shikshan Sanstha's

Yashwantrao Chavan Institute of Science, Satara (Autonomous)

Undergraduate Programme

B. Sc. Computer Science (Entire)

Syllabi of the course

Choice based credit system syllabus

(To be implemented from academic year 2021-22)

Department of Computer Science (Entire)

Index

Sr. No.	Details	Page No.
1	Preamble	
2	B.Sc. Part I	

Preamble:

There are bright career prospects for computer science professionals or software professionals in recent scenario. With the opening of huge software and IT companies in India, the job opportunities for trained professionals have increased considerably. India is known to be a leader in software and IT sector.

Computer science graduates pass out find job opportunities in a variety of environments in academia, research, industry, government, private, business organizations and so on.

They are involved in analyzing problems for solutions, formulating and testing, using advanced communications or multi-media equipment, or working in teams for product development.

The software and IT companies are the major employers of computer science graduates. They offer the best packages to the young graduates which are unmatched with other branches of science.

General Objectives of the Programme:

1. To nurture academicians with focus and commitment to their subject.
2. To shape good and informed citizens from the students entering into the Programme.
3. To create a skilled workforce to match the requirements of the society.
4. To impart knowledge of Science is the basic objective of this Programme.
5. To develop scientific attitude is the major objective so as to make the students open minded, critical and curious.
6. To develop skill in practical work, experiments and laboratory materials and equipments along with the collection and interpretation of scientific data to contribute to science.

Programme Outcomes:

1. The students will graduate with proficiency in the subject of their choice.
2. The students will be eligible to continue higher studies in their subject.
3. The students will be eligible to pursue higher studies abroad.
4. The students will be eligible to appear for the examinations for jobs in government organizations.
5. The students will be eligible to apply for jobs with a minimum requirement of B.Sc. Programme.

Program Specific Objectives of the Course:

1. The content of the syllabus have been framed as per UGC norms of CBCS Pattern.
2. The students are expected to understand the fundamentals, principles, mathematical, recent IT concepts and recent developments in the subject area.
3. The practical course is in relevance to the theory courses to improve the understanding of the concepts.
4. It is expected to inspire and boost interest of the students towards Computer Science as the main subject.
5. To develop the power of appreciations, the achievements in Computer and role in nature and society.
6. To enhance student sense of enthusiasm towards IT and to involve them in an intellectually stimulating experience of learning in a supportive environment.

Program Specific Outcomes:

After successful completion of B.Sc. Computer Science (Entire) Course student will be able to:

1. Understand the basics of Computer Science.
2. Learn, design and perform experiments in the labs to demonstrate the concepts, principles and theories learned in the classrooms.
3. Develop the ability to apply the knowledge acquired in the classroom and laboratories to specific problems in theoretical and experimental Computer Science.
4. Identify their area of interest in academic, research and development.
5. Perform job in various fields' like IT, science, engineering, education, banking, business and public service, etc. or be an entrepreneur with precision, analytical mind, innovative thinking, clarity of thought, expression, and systematic approach.

Subject	Course	ESE	Internal Exam		Subject	Practical-I		Submission	
			CCE-I	CCE-II (Online Test)		Exam	Journal	Case study/Educational Tour/Seminar	Day to day Performance
BCSET-101	C Programming-I	30	5	5	BCSEP-110: LAB1-C	30	5	5	5
BCSET-102	Database Management System	30	5	5	BCSEP-111: LAB2-DBMS	30	5	5	5
BCSET-103	Computer Organization	30	5	5	BCSEP-112: LAB3- CO, NW	30	5	5	5
BCSET-104	Essentials of Networking	30	5	5					
BCSET-105	Fundamentals of Electronics	30	5	5	BCSEP-113: LAB4- FE(50%), DM(25%), Stat (25%)	20	5	5	5
BCSET-106	Discrete Mathematics	30	5	5					
BCSET-107	Computational Statistics I	30	5	5					
AECC1	English for communication I	40	5	5					
Total of SEM I	TOTAL	250	40	40		110	20	20	20
	GRAND TOTAL	500							

B. Sc. I SEMESTER– II (Duration – 6 Months)

S r. N o.	SUBJ T TITL E	COURSE NO AND TITEL	TEACHING SCHEME						
			Theory			Practical			
			No. of lectur es	Ho urs	Cre dits	Subject	No. of lect ures	Ho urs	Cre dits
1	BCSE T-201	C Programming-II	3	2.4	2	BCSEP- 210: LAB V – C II	4	3.2	2
2	BCSE T-202	Relational Data base Management System	3	2.4	2	BCSEP- 211: LABVI- RDBMS,	4	3.2	2
3	BCSE T-203	Linux OS	3	2.4	2	BCSEP- 212: LAB VII – OS NW	4	3.2	2
4	BCSE T- 204	Computer Networks	3	2.4	2				
5	BCSE T- 205	Digital Electronics	3	2.4	2	BCSEP- 213: LABVIII- DE(50%), GT(25%), SM(25%)	4	3.2	2
6	BCSE T-206	Graph Theory and Calculus	3	2.4	2				
7	BCSE T- 207	Statistical Methods I	3	2.4	2				
8	AECC 1	English for communication II	3	2.4	2				
	Total of SEM II		24	19.2	16		16	12.8	8

Subject	Course	ESE	Internal Exam		Subject	Practical-I		Submission	
			CC E-I	CCE-II (Online Test)		Exam	Journal	Case study/Educational Tour/Seminar	Day to day Performance
BCSET-201	C Programming-II	30	5	5	BCSEP-210: LAB V - WEB, C	30	5	5	5
BCSET-202	Relational Database Management System	30	5	5	BCSEP-211: LAB VI- RDBMS,	30	5	5	5
BCSET-203	Linux OS	30	5	5	BCSEP-212: LAB VII- Linux,C N	30	5	5	5
BCSET-204	Computer Networks	30	5	5					
BCSET-205	Digital Electronics	30	5	5	BCSEP-213: LAB VIII- DE(50%) , GT(25%) ,SM I(25%)	20	5	5	5
BCSET-206	Graph Theory and Calculus	30	5	5					
BCSET-207	Statistical Methods I	30	5	5					
AECC1	English for communication II	40	5	5					
Total of SEM II	TOTAL	250	40	40	0	110	20	20	20
	GRAND TOTAL	500							

Structure and Titles of Courses of B.Sc. Course :

B.Sc. I Semester I

Sr.No.	Course No.	Course Name
1	BCSET-101	C Programming-I
2	BCSET-102	Database Management System
3	BCSET- 103	Computer Organization
4	BCSET- 104	Essentials of Networking
5	BCSET- 105	Fundamentals of Electronics
6	BCSET- 106	Discrete Mathematics
7	BCSET- 107	Computational Statistics I
8	AECC	English for communication I

B.Sc. I Semester II

Sr.No.	Course No.	Course Name
1	BCSET-201	C Programming-II
2	BCSET-202	Relational Database Management System
3	BCSET- 203	Linux OS
4	BCSET- 204	Computer Networks
5	BCSET- 205	Digital Electronics
6	BCSET- 206	Graph Theory and Calculus
7	BCSET- 207	Statistical Methods I
8	AECC	English for communication II

3) OTHER FEATURES:

A) LIBRARY:

Sr.No.	Book Name	Authors Name
1	Multimedia and web Technology	Mukesh Kumar
2	Multimedia and web Technology	Mukesh Kumar
3	Businesses Stat	P.K. Vishwanathan
4	Introduced to Sol	Reek F. VonnerLans
5	O.S Principles	AhrahamSilberschat
6	HTML 4	Rick Doread
7	Stat for Mgmt.	Rickhot I. Levn
8	Victory Guide Probability &Kandomprob	Dr. A.Singaravelu

9	Prob. And queeing theory	G.Balaji
10	Programming ANSI,C	E. Balgursam
11	Cracledb 109	Kevin Loney
12	E-Commerce	David utiteley
13	Ascii	E. Balgursamy
14	Desktop application a Microsoft windows XP O.S	Waltergleny
15	Android	Jerome J. F.
16	Java	Josepseph O. Nil
17	Fundamentals of S.F	Rajib Mall
18	Compiler Design	Dr. O. G.Kakade
19	80st lic& embedded sym	M.A. Mazidi
20	Information Security	R. F. Smith
21	Fundamental of DBMS	RomezElmasn
22	Operating System	MilonMilenkovie
23	Unix in Easy	MohamadAzam
24	Digital Camp electronics	Abbertmalvino
25	E-Commerce	Honychan
26	Programming with C	K. R. Venugopal
27	Web publishen with HTML	Devid Fox
28	Sherlock Holmen	Arthor Conon
29	Corporate Chanakkya	RadhakrushnanPille
30	Comp H/w & N/w	I.E. Dayanand
31	Photoshop 6	Firwall media
32	Web Designing	Vishnu Priya Sing
33	Operation Research	J. K. Sharama
34	Arithmetic &quantitive aptitude	R. Bopal
35	Fundamental of English usage	BBA/HM
36	General knowledge	BBA/HM
37	Fundamental of researching	BBA/HM
38	Fundamental of researching	BBA/HM
39	Theory &prob with applications	Nem Sing
40	Engg mathematics	N. Vynakatromon
41	Mathematics Capsul	GuozoxKapur
42	Quikermaths	M. Tyra
43	Object oriented programming	E. Balgurusamy
44	Algebra	S. K. Goyal
45	Java programming	Dramdake s/w teami
46	Business Statistics	N. P. Vohavea

47	Accounting with tally 9.0	Dinesh Moidasoni
48	Electronics Components	K. Pandmanabha
49	Applied mathematics	G. V. Kurbojkar
50	Computer N/W	Tononbam
51	Cryptography & N/W Security	B.L. Chonilathe
52	Linear programming & Decision making	A.S. Narag
53	Comp. Organization	RashamiSharama
54	Electrical Circuit theory	A.Balkrushan
55	Applied mathematics	G.V.Kumbhojkar
56	RDBMS Design & Oracle	See Net
57	Operations Research	NitinKulkarni
58	Oracles 8 DBA AQL & RL/SQL	Michael R. Ault
59	Embedded Systems	Raj. Kamal
60	Rescued by active Server (Asp.Net)	Kris Jamsa
61	UNIX Complete	Peter Dyson, JohnHellborn
62	Management info sym	James A O Brien
63	Analysis & design of Algo C & C++	Prof. S. Nandagopalan
64	DSP	Rafael C.Gonzalez
65	Operating System	Gupta Chaturvedi
66	Operating System	Willam Stallings
67	Digital Electronics	A.P. Godase
68	Transforms & partice diff. equation	Dr. J. John
69	Software Quality Assurance	Sikkim manipal Uni.
70	Software Engineering	C.ShinyKirusa
71	Programming with C++	D.Ravichandarn
72	Fundamental of Soft Engi	Rajib Mall
73	Advanced up	A.P. Godase
74	Numerical methods	G. Balaji
75	Computer Organization	Carl Hamcher
76	Photoshop C.S.	ShrutiLal
77	Operational System	Madnieb Donavan
78	Probability R.V. & R.	P.Kandasamy
79	Ordinary Differential equation	S.G. Deo
80	Stat & Numerical methods	G. Balaji
81	Advanced Engi. Math.	S.F. Jamanadas& Co
82	Probability & queueing	G.Balaji
83	Data structure & Algo Ana inc.	Mark Alenweiss

84	Stat & Numerical Methods	Dr. A. Singaravelu
85	Let us C.	Yashvantnetkar
86	Comp Business Statistics	Amir D. Aezel
87	Electronics Device &Ckt	A.P. Godase
88	Power Electronics	B.R. Gupta
89	Micro Processor & Micro Controller	Krishan Kant
90	Database sym Concept	Siberschatz
91	Database sym Concept	Siberschatz
92	Microwave Engineering	Annapurna Das
93	Adv. Java technology	A.A. Puntambekar
94	Gathode	P.L. Deshpande
95	MazaLadha	Adolf Hitlar
96	1001 Comp Hints & tips	Christopher Cavanaugh
97	IT Security	Taxmanapublicatn
98	Chandaragupta	G.V. Salavi
99	VB. Net	Vishnu Priya Singh
100	Critical &manag prof docu using office word 2007	Niti
101	Comp oper&prog Assistant	A.assian publication
102	C.Prog	I.EdwinDayanand
103	Indian economy	V.K. Bahargav
104	Data Communication and N/W	Forouzan
105	Oxford Dictionary	Sara Hawker
106	Pocket Dictionary	Chs Publication
107	Capsul Math	Asian
108	Elec Communication	George Kennedy
109	HTML, DHTML-JAVA Script	Even Bayrott
110	Adob Photoshop	Vishnu Priya Singh
111	Laptop Course	Vishnu Priya Singh
112	MS Office	Vishnu Priya Singh
113	Dreamweaver 4	Christophe AUBRY
114	Fundamentals of DBMS	Sikkim Manipal University
115	Internet & Web Designing	Ramesh Bangra
116	Cyber Crime, Electronic Evidence & Investigation	VivekSood
117	Terrorism	Prof. RakeshSinha
118	Statistics For Economics Textbook	
119	Cerdit Appraisal, Risk Analysis &Decision Making	D.D. Mukharjee

120	Database System Concept	Abraham Silberschatz
121	Pro C# with NET 3.0	Andrew Troelsen
122	Red Hat Linux Ver(10)	Christopher Negus
123	Business Statistics	N. P. Vohora
124	Software Engineering	Roger S. Pressman

B) SPECIFIC EQUIPMENTS :

1. Computers
2. Printer, Scanners
3. LCD Projector
4. LCD Projector Screen
5. Smart Board
6. Visualizer
7. CRO's
8. Regulated Power Supplies
9. Function Generators
10. Multimeter, Voltmeters, Ammeters
11. Resistance Boxes/Rheostats

**Head Dept. of
B.Sc.C.S.(Entire)**

B.Sc. Part I: Computer Science (Entire)

BCSET-101:C Programming – I

Course Objectives: -

- i. To develop a Programming logic.
- ii. To teach basic principles of programming.
- iii. To develop skills for writing programs using ‘C’.
- iv. To develop skill of Control structure and function concepts using ‘C’

Unit –1 Introduction to ‘C’ (9)

Basics of Linux Operating System(Ubuntu) and ‘C’ programming
Language in Linux, History of ‘C’, Characteristics of C Language, Algorithm,
Flowcharts- (Definition, Symbol, features), Character set and keywords , Structure
of ‘C’ programming, Constant and its type, Compiling and debugging the program,
Introduction of C Compiler-GCC Compiler, Vim Editor.

Unit- 2 Input-Output Statements (9)

Variable and its Data types in ‘C’., Operators- Arithmetic, logical, relational,
bitwise, increment, decrement, conditional, operator precedence.
Character input-output –getch(), getche(),getchar(),putchar() , String input-output -
gets(), puts()Formatted input-output - printf(), scanf().

Unit-3 Control Structures (9)

Conditional control statements- if, if else, nested if, else if ladder, switch.
Looping – for statements, nested for, while, do-while statements, nested while and
do while, Infinite loop, Unconditional breaking control statements- break,
continue, goto.

Unit-4 Functions (9)

Definition, Declaration, prototype of function, Local and global variable, User
defined Functions, Recursion, Call by value and Call by reference, Preprocessor,
Macros.String functions(strcpy(), strcmp(), strcat(), strlen(), strev()).

Course Outcomes: -

1. Illustrate the flowchart and design an algorithm for a given problem and to develop solution
2. Develop conditional and unconditional statements to write C program.
3. Exercise user defined functions to solve real time problems.

Reference Books: –

- 1) E. Balgurusamy, Programming in ANCI ‘C’(New Delhi: McGraw Hill, 2012)(Page No. : Unit-1: 22-45, Unit -2: 52-71, 83-96, Unit-3: 112-135, 151-168, Unit-4: 270-312, 237-261)
- 2)Y. C. Kanetkar,Let us C (New Delhi : BPB Publication,2012) (Page No.: Unit-1: 607-610, 1-12,Unit-3: 45-70, 95-119,133-144 Unit-4: 154-182, 334-

349)

3) K.R.Venugopal, Programming with 'C'(New Delhi : McGraw Hill,1999)
(Page No. : Unit-1: 11-41, 345-368 Unit- 2 : 29-41,47-61 Unit-3: 65-96
Unit-4: 105-130)

LABI: BCSEP-110: Based on BCSET101

Course Objectives:

- i. To understand programming and its roles in problem solving
- ii. To understand and develop well-structured programs using C language
- iii. To develop programming skills using the fundamentals and basics of C Language.
- iv. To teach the student to write algorithms and flowchart of programs in C and to solve the problems.

Practicals:

- 1) Write a program on arithmetic operator
- 2) Write a Program to convert the Temperature in centigrade degree to the Fahrenheit degree.
- 3) Write a program to demonstrate whether given number is even or odd.
- 4) Write a program to find out First Fifty Prime numbers.
- 5) Write a program to display Fibonacci series.
- 6) Write a program to reverse the given number.
- 7) Write a program which display following output-

```
A B C D E
A B C D
A B C
A B
```

A

- 8) Write a program for string functions
- 9) Write a program to calculate area of circle using function
- 10) Write a program calculate sum of two number using macro
- 11) Write a program to use of call by value and call by reference
- 12) Write a program to read single character (getchar())

Course Outcomes: -

- i. Exercise different Operators.
- ii. Understand basic Structure of the C-PROGRAMMING, declaration and usage of variables.
- iii. Understand use of conditional and iterative statements to Write C programs.
- iv. Understand use of C programs using functions.

Reference Books:

- 1) 1) E. Balgurusamy, Programming in ANCI 'C' (New Delhi: McGraw Hill, 2012) (Page No. : Unit-1: 22-45, Unit -2: 52-71, 83-96, Unit-3: 112-135, 151-168, Unit-4: 270-312, 237-261)
- 2) Y. C. Kanetkar, Let us C (New Delhi : BPB Publication, 2012) (Page No. : Unit-1: 607-610, 1-12, Unit-3: 45-70, 95-119, 133-144 Unit-4: 154-182, 334-349)
- 3) K.R.Venugopal, Programming with 'C' (New Delhi : McGraw Hill, 1999) (Page No. : Unit-1: 11-41, 345-368 Unit- 2 : 29-41, 47-61 Unit-3: 65-96 Unit-4: 105-130)

BCSET-102: Database Management System

Course Objectives: -

1. To study the concepts and terminologies of File Management System
2. To study the concepts and terminologies of DBMS
3. To Understand ER-Model
4. To Study different database systems.

Unit-I - Organization of Database System (9)

Introduction of file, file types, organization of file- heap file organization, serial file organization, sequential, index sequential file, random access file (direct access file), Definition of Data, Information, Database, Needs, features Database Management Systems (DBMS): Definition, components, comparison of file processing system with DBMS.

Unit-II – Database concepts (9)

Types of Database System: centralized database system, client-server system, distributed database system, Functions of DBMS, advantages, disadvantages of DBMS, Structure of DBMS, Services provided by DBMS, schema, subschema, data abstraction, data independence, architecture of database system, data dictionary, database administration, database manager.

Unit-III - Data Models (9)

Introduction, definition, features of data models, Object based data models- Entity Relationship Model, cardinality, Record based models- Relational Model, Network Model, Hierarchical Model, Physical Data Models Keys: Primary key, foreign key, candidate key, super key, unique key

Unit-IV – Conceptual Design (E-R model) (9)

Overview of DB design, ER data model (entities, attributes, entity sets, relations, relationship sets, ER Diagram , DFD), Additional constraints (key constraints, participation constraints, weak entities, aggregation / generalization, Conceptual design for small to large enterprises, Case Study: Design Database System for- Library management system, Bank management system, Inventory management system

Course Outcomes: -

1. Improving skill about data operation.
2. Ability to handle database.
3. Ability to design & develop proper database.
4. Ability to design ER-Model on Case study

Reference Books:

1. Silberschatz, Korth, Database System Concept (New Delhi: McGraw Hill, 2002) (Page No.: Unit-1: 1-18, 393-426 Unit-2:)
2. Fundamentals of Database System- Ramez Elmasri, Shamkant B. Navathe (Pearson)
3. Database Management System- Ragu Ramkrishnan, Gehrke (McGraw Hill)
4. Database Management System- R. Panneerselvam
5. Ms-Office Complete reference

LABII: BCSEP-111: Based on BCSET102**Course Objectives: -**

1. To study the concepts and terminologies of DBMS
2. To understand concept of Data, Entity, Entity Set concepts
3. To Understand relationships among entities.
5. To understand how to use ER Model.

Case Study:

1. Case study on College management system
2. Case study on Hospital management system
3. Case study on Rail-way management system
4. Case study on Banking management system
5. Case Study on Library System.

Course Outcomes: -

1. Improving skill about data operation.
2. Ability to handle database.
3. Ability to design & develop proper database.
4. Ability to design ER-Model on Case study

Reference Books:

1. Database System Concept – Silberschatz, Korth (Unit 1 - (1-33) , Unit 2 (1-33, 41), Unit 3 (241-285)
2. Fundamentals of Database System- Ramez Elmasri, Shamkant B. Navathe (Pearson) (Unit 1 - (34-57) , Unit 3 (62-68, 504), Unit 4 (138-152)
3. Database Management System- Ragu Ramkrishnan, Gehrke (McGraw Hill) (Unit 1 - (3-21) , Unit 3 (25-45), Unit 4 (25-45)

BCSET103: Computer Organization**Course Objectives: -**

- i) To learn fundamental of computers
- ii) To learn the concepts Central Processing Unit.
- iii) To learn the concept of computer language.
- iv) To learn the concept of computer software.

Unit –I: Introduction to Computer (9)

Introduction, Definition of computer, Types of Computers- Minicomputer, Micro Computer, Mainframe and Super Computers, Laptop and tablet, characteristics of computer, Limitations and Advantages of Computer, Applications of computer

UNIT – II: The Central Processing Unit (9)

Block diagram - Input Unit, Process, Output unit. Central processing unit- Structure and Function, Arithmetic & Logic Unit- Structure and Function, Control Unit- Structure and Function, Memory Unit - Structure and Function.

Unit – III: Computer languages (9)

Introduction, Machine Language: Introduction, Characteristics, Applications, Advantages and Disadvantages, Assembly Language: Introduction, Characteristics, Applications, Advantages and Disadvantages, High Level Languages: Introduction, Characteristics, Applications, Advantages and Disadvantages, Translators- Assembler, Compiler and Interpreter

Unit –IV: Computer Software and Utility (9)

Introduction, Types of software: System Software, Application Software. System Software: Operating System., Introduction to GUI: Desktop Icons, File and Directory structure, Menu Items, Control Panel, File and Directory Search Utility programs: Anti-plagiarism software, Anti-virus, Disk Cleaning, Defragmentation, Compression/Decompression of files. Application software, Software -License, Freeware, Shareware.

Course Outcomes: -

- i) Understand the basic concepts of computer
- ii) Understand the basic concepts of Central Processing Unit
- iii) Understand the basic concepts of different computer language
- iv) Understand the basic concepts of Software

Reference Books: -

- 1) Suresh K.Basandra,Computer Today(New Delhi: Galgotia Publications Pvt. Ltd ,1995)
- 2) V.Rajaraman,Fundamental of computer(New Delhi: Prentice-Hall of India, 1985)
- 3) P.K.Sinha,Computer Fundamentals(New Delhi:BPB Publication,2011)(Unit 1:1-3,410-420,)(Unit 2:19-21,104-106,)(Unit 3:220-236)(Unit 4:180-183)

BCSET-104: Essentials of Networking

Course Objectives:-

- I. To study basic of computer network
- II. To study working of OSI model
- III. To understand concept TCP/IP model
- IV. To understand functions of Network protocol

Unit I: Basics of Computer Network (10)

Define computer network, identifying basic networking elements and describing roles of Clients, Server, Peers, and Transmission Media, LAN, MAN, WAN, Centralized & distributed network architecture, Cable Media & Wireless Media, Network Connectivity devices, Modem, repeaters, Hubs, Bridges, Multiplexes and routers

Unit II: OSI Layers (9)

Introduction, Layers of OSI, Physical Layer, Data link Layer, Switching Methods, Routing, Network layer connection services, Bridging, Transport Layer, Address name resolution, Flow control, Error control, Session Layer, Session Administration, Presentation Layer, Application Layer.

Unit III: TCP/IP (8)

Layers of TCP/IP, Physical Layer, Data link Layer, Network, Transport, Application layers

Unit III: Networking Protocols (9)

Transmission Control Protocol (TCP), Internet Protocol (IP), User Datagram Protocol (UDP), Post office Protocol (POP), Simple mail transport Protocol (SMTP), File Transfer Protocol (FTP), Hyper Text Transfer Protocol (HTTP), Hyper Text Transfer Protocol Secure (HTTPS)

Course Outcomes: -

- i. To understand basic of computer network

- ii. To understand working of OSI model
- iii. To use concept TCP/IP model
- iv. To use functions of Network protocol

Reference Books

- 1) P.K. Sinha, Computer fundamentals (New Delhi: BPB publication, 2016)(Page No.:Unit-1: 347-377)
2. B.A. Forouzan, Data Communications and Networking 5E (New Delhi: McGraw Hill, 2013) (Page No.:Unit-1: 7-19, 187-201 Unit-2& Unit-3: 51-1051, Unit-4: 509-801)
- 3) A. S. Tanenbaum, Computer networks (Noida: Dorling Kindersley, 2016) (Page No.:Unit-1: 18-27 Unit-2 : 41-50 Unit-3: 89-611 Unit-4: 442-508)

LABIII: BCSEP-112: Based on BCSET103 & BCSET104

Course Objectives: -

- i) To learn fundamental of computers
- ii) To learn the concepts Central Processing Unit.
- iii) To study working of OSI model
- iv) To understand concept TCP/IP model

Part A: Based on BCSET 103

- 1) Demonstration of Input Device.
- 2) Demonstration of Output Device
- 3) Demonstration Of Pointing Devices
- 4) Demonstration of Memory Device.
- 5) Demonstration of CPU.

Part B: Based on BCSET 104

- 1) Demonstration of LAN, MAN, WAN.
- 2) Demonstration of Networking Devices-Modem, Hub, Switch, Router.
- 3) Demonstration of Wired Media.

Course Outcomes: -

- i) Understand the basic concepts of computer
- ii) Understand the basic concepts of Central Processing Unit
- iii) Understand working of LAN, MAN, WAN
- iv) Understand cable network.

Reference Books: -

- 1) P.K. Sinha, Computer fundamentals (New Delhi: BPB publication, 2016)
2. B.A. Forouzan, Data Communications and Networking 5E (New Delhi: McGraw Hill, 2013)
- 3) A. S. Tanenbaum, Computer networks (Noida: Dorling Kindersley, 2016)

BCSET- 105: Fundamental of Electronics

Course Objectives: -

- i. To learn the principle of circuit analysis and design.
- ii. To learn the basic concepts and characteristics of electronic devices and circuits.
- iii. To understand AC sources, DC sources and their concept.
- iv. To verify the theoretical concept through laboratory experiment.

Unit I: Basic components and Network Theorems (9)

AC Sources, DC Sources, Types of batteries, Concept of Single Phase, Three phase, Power Supplies, Active, Passive Components, Resistor, Capacitor, Inductor, Transformer. (Qualitative Idea) Ohm's Law, Kirchhoff's Law, Thevenin's theorem, Norton Theorem, Superposition Theorem.

Unit II: Semiconductor Device (9)

Doping, P-N junction Diode, Characteristics, Clipper, Clamper, LED, Photodiode, BJT, Modes of Transistor.

Unit III: Amplifiers and Oscillators (9)

Transistor Amplifiers, Introduction of Oscillator, Phase Shift, Wein Bridge, Hartley, Colpitts, Crystal Oscillator.

Unit IV: Multivibrators (9)

UJT as sweep generator, Transistor as Astable, Bistable and Monostable Multivibrator. Using IC 555 as Astable and Monostable Multivibrator.

Reference Books:

1. R. S. Sedha, A text of Applied Electronics (New Delhi: S Chand Publication, 2012) (**Page No.:** Unit-1: 100-149, 72-91 Unit-2: 208-284 Unit-3: 684-726)
2. B. L. Thereja, Basic Electronics Solid State, (New Delhi: S. Chand & Company LTD, 2005) (**Page No.:** Unit 1: 29-82, Unit 2: 208-284)
3. Ben G Streetman and S. Banerjee, Solid State Electronic Devices (New Delhi: Pearson Education, 2006) (**Page No.:** Unit 2: 207-243, 434-451)
4. G.K. Mithal, Electronic Devices and Circuits, (Delhi: Khanna publication, 1997) (**Page No.:** Unit 4: 425-532)

Course Outcomes: -

Students will be able to:

- i. Categorize the basic electronic components.
- ii. Examine electronic circuits using network theorems.
- iii. Build various Oscillators Circuits.
- iv. Construct multivibrators for electronic applications.

BCSET-106 Discrete Mathematics**Course Objectives:-**

- i. To understand recursive techniques to count elements of set.
- ii. To understand concept of relation and function
- iii. To learn the concept of Boolean Algebra
- iv. To learn the concept of recurrence relation

Unit –1: Counting Principles (10)

Counting: Addition & Multiplication principle, Permutation and Combination ,Cardinality of finite set, Cardinality of union of sets (Addition principle) ,Principle of Inclusion and Exclusion. Examples. Combinatorial Arguments, Pigeonhole Principle (Statement only). Examples.

Unit –2: Relation and Functions (10)

Ordered pairs, Cartesian product, Relations, Types of relations, Equivalence relation, Partial ordering, Digraphs of relations, matrix representation and composition of relations, Transitive closure, Warshall's algorithm, Equivalence class, Partition of a set Functions : Definition, Types of mapping , Injective, Surjective & Bijective functions, Inverse function, Composition of functions,

Unit –3: Boolean algebra (10)

Hasse diagram Lattice: Definition, principle of duality, Basic properties of algebraic systems defined by Lattices, Distributive and complemented lattices , Boolean lattices and Boolean algebras Boolean expressions and Boolean functions, Disjunctive and conjunctive normal forms and examples , Switching circuit

Unit –4: Recurrence Relations (06)

Introduction, Linear Recurrence relation with constant coefficient. Homogeneous solutions, Particular and Total solution .

Course Outcomes:

- i. Demonstrate mathematical skills, analytical and critical thinking abilities.

- ii. Analyze the types of relations and functions.
- iii. Construct Boolean lattice by using Hasse diagram.
- iv. Construct and solve recurrence relations

Textbook:

1. S.R.Patil and others, A Text book of Discrete mathematics (India: NIRALI Prakashan, 2008), 1.1- 5.21
2. S.R.Patil and others, A Text book of Algebra and Calculus (India: NIRALI Prakashan, 2008),Unit 2:1.1-1.6.

Reference Books:

1. Oscar Levin, Discrete Mathematics – An Open Introduction (Greeley: University of Northern Colorado press, 2013), Unit 1:57-67 , 81-86 Unit 2: 39-51.
2. Davender Malik, Discrete Mathematics (India: Indian Binding House, 2009), Unit 1: 226-262, Unit 3: 413-442, Unit 4:263-291.
3. Ken Levasseur, Al Doerr., Applied Discrete Structures (Pearson Education, Inc. 2012), Unit 1: 20-33, Unit 2: 100-133, Unit 3:343-361, Unit 4:149-159.

BCSET- 107: Computational Statistics I

Course Objectives:-

- i. To learn fundamental concepts of Statistics.
- ii. To learn the concepts of Data Condensation and Graphical Methods.
- iii. To learn the principle of Measures of central tendency and Measures of dispersion.
- iv. To learn the concepts of Moments, Skewness and Kurtosis.

Unit-1 Data Condensation and Graphical Methods: (8)

Definition, importance, Scope and Limitations of statistics w.r.to computer science.Scales of measurements: Nominal, Ordinal, Interval & Ratio. Data Condensation: Raw data, Attributes and variables, discrete and Continuous variables, Classification and Construction of frequency distribution, Graphical Representation: Histogram, Frequency polygon, Frequency curve, Ogive Curves and their uses, Boxplot, Examples and Problems.

Unit-2 Measures of Central Tendency: (10)

Concept of central tendency, Criteria for good measures of central tendency, Arithmetic mean: Definition, computation for ungrouped and grouped data,

combined mean, weighted mean, merits and demerits, Median: Definition, formula for computation for ungrouped and grouped data, graphical method, merits and demerits, Mode: Definition, formula for computing for ungrouped and grouped data, merits and demerits, Quantiles: Definition, formula for computation for ungrouped and grouped data, graphical method, Numerical problems.

Unit-3 Measures of Dispersion: (10)

Concept of dispersion and measures of dispersion, absolute and relative measures of dispersion, Range and Quartile Deviation: definition for ungrouped and grouped data and their coefficients, merits and demerits, Mean Deviation: definition for ungrouped and grouped data, minimal property (statement only), Standard deviation and Variance: definition for ungrouped and grouped data, coefficient of variation, combined variance and s.d. for two groups, merits and demerits, Numerical problems.

Unit-4 Moments, Skewness and Kurtosis: (8)

Raw and central moments: definition for ungrouped and grouped data (only first four moments), relation between central and raw moments (statement only), Sheppard's Correction, Measures of skewness: Types of skewness, Karl Pearson's and Bowley's coefficient of skewness, Measures of skewness based on moments, Measures of Kurtosis: Types of kurtosis, Measures of kurtosis based on moments, Numerical problems.

Reference Books:-

1. Amir D. Aczel, Jayavel Sounderpandian. Complete Business Statistics, (6th Edition), New Delhi, Tata MacGraw-Hill Publishing Company Ltd., 2006.

(Unit-1: 22-25, 58-60, Unit-2: 28-31, Unit-3: 35-40, Unit-4: 40-43)

2. S. C. Gupta. Fundamental of Statistics (7th Edition), Mumbai, Himalaya Publishing House, 2018.

(Unit-1: 2.2-2.20, 3.1, 3.41, 4.1-4.61, Unit-2: 5.1-5.47, Unit-3: 6.1-6.60,

Unit-4: 7.1-7.38)

3. D.N. Elhance, Veena Elhance, B. L. Agarwal, Fundamental of Statistics Alhabad, Kitab Mahal Publication, 1956.

(Unit-1: 3.1-3.11, 4.1-4.12, 5.1-5.17, 6.5, 19.8-19.16 Unit-2: 8.1-8.58,

Unit-3: 9.1-9.41, Unit-4: 10.1-10.29)

4. Murray R. Spiegel, Larry J. Stephens, Statistics (4th Edition), New Delhi, Tata MacGraw-Hill Publishing Company Ltd., 2010.

(Unit-1: 1.1-1.6, 2.1-2.6, Unit-2: 3.1-3.6, 3.9, Unit-3: 4.1-4.5, Unit-4: 5.1-5.4)

Course Outcomes:

- i) To classify and tabulate the data.
- ii) To draw and interpreted various graphs and diagrams.
- iii) To compute and interpret measures of central tendency.
- iv) To compute and interpret measures of dispersion.
- v) To demonstrate the shape and size of data.

BCSEP-113: LAB IV – Based on BCSET: 105, BCSET: 106 and BCSET: 107

Part A: Based on BCSET: 105

Course Objectives: -

- i. To learn basic electronic circuits.
- ii. To learn basic operations of Multimeter, CRO, function generator, power supplies.
- iii. To learn Laws and theorem.
- iv. To learn the characteristics of P-N Diode, FWR etc.

Practical Set

1. Study of Electronics components.
2. Study of CRO.
3. Verification of Kirchhoff's Law.
4. Verification of Thevenin's Theorem.
5. Study of I-V characteristics of PN junction Diode.
6. Study of Half wave Rectifier.
7. Study of Full wave Rectifier.
8. Study of transistor as a switch.
9. Study of Astable multivibrator using BJT/555.
10. Study of Monostable multivibrator using BJT/555.
11. Study of the Phase shift Oscillator using transistor.
12. Study of Crystal Oscillator using transistor.

Course Outcomes: -

Students should demonstrate their ability to:

- i. Design and analyze basic electronics components and circuit.
- ii. Analyze the operations of multi-meter (Analog & digital), function generator, power supply and CRO.
- iii. Design linear and multivibrator circuits.
- iv. Design a Low and High frequency Oscillator.

Part B:BCSET: 106 (Discrete Mathematics)

A) Mathematics

Course Objectives

- i. To understand Recurrence relation
- ii. To develop skills of different Algorithms with an examples
- iii. To understand representation of lattice and switching circuit
- iv. To find transitive closure by using Warshall's algorithm

Student should Explain and verify

1. Recurrence relation with an example
2. Switching Circuit with an example
3. Combinatorial arguments
4. Representation of lattice by Hasse diagram
5. Transitive Closure by using Warshall's algorithm
6. Disjunctive and Conjunctive normal forms of Boolean expression with an example
7. Representation of relation by matrix and digraph

Course Outcomes:

- i. Construct and solve recurrence relation
- ii. Represent lattice by Hasse Diagram
- iii. Represent relation by matrix and digraph

Part C:107 (Computational Statistics I)

Course Objectives:

- i) To construct the data.
- ii) To Understand the Graphical representation
- iii) To compute Measures of central tendency and dispersion
- iii) To study computations for Moments of Skewness and Kurtosis

- 1) Construction of frequency distributions.
- 2) Graphical Representation.
- 3) Measures of Central tendency(Ungrouped data).
- 4) Measures of Central tendency(Grouped data).
- 5) Measures of dispersion (Ungrouped data).
- 6) Measures of dispersion (Grouped data).
- 7) Moments, Skewness and Kurtosis (Ungrouped data).
- 8) Moments, Skewness and Kurtosis (Grouped data).

Course Outcomes:

- i) To construct data.
- ii) To draw and interpreted the graphs and diagrams.
- iii) To analyses and interpreted the data by various statistical techniques.
- iv) To exhibit critical and creative thinking skills for analysis and evaluation of problems.
- v) To demonstrate MS-Excel.

Semester II

BCSET-201 :C Programming – II

Course Objectives:-

- i. To Develop a Programming logic.
- ii. To teach basic principles of programming.
- iii. To develop skills for writing programs using ‘C’.

Unit- I Arrays

(09)

Definition and declaration of array, Features of Array, Initialization of array, Memory representation of array, Types of Arrays-Single Dimensional Array, Two Dimensional Array, Multi Dimensional Array.

Addition of array, multiplication of arrays

Unit-II Pointers

(09)

Definition and declaration, Pointer initialization , Operations on pointer , Use of Pointer in Function, Array of Pointer, Pointer of pointer, Dynamic memory allocation

Unit-III Structures and Union

(09)

Definition and declaration, Array of structures, Passing structure to function, Pointer to structure , Nested structure, self-referential structure, Sizeof() and typedef() , Definition of Union and declaration, Difference between structure and Union

Unit-IV File Handling

(09)

Concept of File , Text and binary files, Opening and closing files, File opening mode- (read, write, append) , Character and integer handling (getc(), putc() , getw() , putw()) , Formatted input- (scanf(), sscanf(), fscanf(), fread()), Formatted output- (printf(), sprintf(), fprintf(), fwrite()), Functions- (fseek(), ftell(), fflush(), fclose(), fopen(), rewind())

Course Outcomes:-

- i. Study different basic concepts arrays in C
- ii. Understand the different concepts of operations on Pointers.
- iii. Understand the concepts of Structure and Union.
- iv. To implement File handling in C.

Reference Books:-

Reference Books: –

- 1) E. Balgurusamy, Programming in ANCI ‘C’(New Delhi: McGraw Hill, 2012)(Page No. : Unit-1: 192-217, Unit -2: 357-384 Unit-3: 324-344, Unit-

4: 395-414)

2) Y. C. Kanetkar, Let us C (New Delhi : BPB Publication, 2012) (Page No. : Unit-1: 274-307, Unit-2 : 174-194 Unit-3: 370-390 Unit-4: 426-463)

3) K.R.Venugopal, Programming with 'C'(New Delhi : McGraw Hill, 1999) (Page No. : Unit-1: 155-162 Unit- 2 : 183-235 Unit-3: 241-277 Unit-4: 315-341)

LABI: BCSEP-210: Based on BCSET 201

Course Objectives: -

- i. To Develop a Programming logic.
- ii. To teach basic principles of programming.
- iii. To develop skills for writing programs using 'C'.

- 1) Write a program to calculate sum and average of given n numbers using array.
- 2) Write a program to add two Matrices; Use two-Dimensional array.
- 3) Write a program to multiplication of two Matrices.
- 4) Student should explain program to reverse string using Pointer.
- 5) Write a program to perform Operation on Pointer.
- 6) Student should demonstrate a program that accepts the Roll No, Name, Marks obtained in three tests of 'N' students & display the total and Average in tabular format.
- 7) Write a program to create Union for 5 records of Student.
- 8) Write a program of Pointer to structure.
- 9) Student should Write a program to separate even and odd numbers available in input file.
- 10) Write a program to Create emp.txt file and save 5 records of Employee

Course Outcomes: -

- i. Study different basic concepts arrays in C
- ii. Understand the different concepts of operations on Pointers.
- iii. Understand the concepts of Structure and Union.
- iv. To implement File handling in C.

Reference Books: -

- 1) E. Balgurusamy, Programming in ANCI 'C'(New Delhi: McGraw Hill, 2012)(Page No. : Unit-1: 192-217, Unit -2: 357-384 Unit-3: 324-344, Unit-

4: 395-414)

2) Y. C. Kanetkar, Let us C (New Delhi : BPB Publication, 2012) (Page No. : Unit-1: 274-307, Unit-2 : 174-194 Unit-3: 370-390 Unit-4: 426-463)

3) K.R. Venugopal, Programming with 'C' (New Delhi : McGraw Hill, 1999) (Page No. : Unit-1: 155-162 Unit-2 : 183-235 Unit-3: 241-277 Unit-4: 315-341)

BCSET-202: Relational Data base Management System

Course Objectives:

1. To study the concepts and terminologies of RDBMS
2. To understand SQL and Normalization concepts.
3. To Study Subqueries and Join
4. To Understand PL/SQL

Unit 1: Introduction to RDBMS (9)

Data, Database, DBMS, RDBMS, Concepts of Data Models objectbased, Record based (Network, Hierarchical, Relational), Physical, Concept of RDBMS Terminologies: relation, attribute, domain, tuple, entities, DBA and Responsibilities of DBA, Relational Model: Structure of Relational Database, Relational Algebra.

Unit 2 : Structured Query Language (SQL) (9)

SQL: Data types □ fixed length, variable length, ex., Data Constraints □ Primary key, Foreign key, Null, Check, Default Clauses □ (select, where, group by, order by)., SQL Operators: Logical, Relational, Special □ In, Between, Like Functions. Aggregate Clauses, Aggregate, Functions, String Functions, Date and Time Functions, Mathematical Functions.

Unit 3: Subqueries and Joins (9)

Sub Queries and Join □ Sub queries and Nesting sub queries, Join: Equijoin, Simple join, Outer join, selfjoin, Views, Indexes, Sequence Normalization: Concept of normalization, advantages, First NF, Second NF, Third NF, examples of normalizations

Unit 4 : Introduction to PL □ SQL (9)

Comparison between SQL & PL □ SQL, Structure of PL □ SQL block., Benefits of PL/SQL over SQL, Control structure: if statement, case statement,

Loops □ Simple looping, For, While., Need of Iterative and , looping statements in data handling

Course Outcomes:

1. Improving skill about RDBMS.
2. Ability to handle SQL.
3. Ability to handle SQL Joins and Subqueries and Normalize data.
4. PL-SQL knowledge.

Reference book □

1. Data base system concept □ Korth Silberschartz. (Unit-I,II,III,)
2. SQL □ PL/SQL by Ivan Bayross BPB Publications. (Unit-I,II,III,IV)
3. Structure query language □ By Osborne (Unit-I,II,III)
4. SQL & PL/SQL FOR ORACLE 11G BLACK BOOK By P S Deshpande July 2012 (Unit-I,II,III,IV)

LABII: BCSEP-211: Based on BCSET 202

Course Objectives:

1. To study the concepts and terminologies of RDBMS
 2. To understand SQL , Normalization concepts.
 3. To Study subqueries and joins
 4. To Understand PL/SQL
-
1. Create student master and student detailed table with appropriate field to apply following constraint on field.
 - a. Primary Key
 - b. Foreign Key
 - c. Not null key
 - d. default key
 - e. Check constraint etc.
 2. Create student table with appropriate field and do.
 - a. Insert 10 appropriate records
 - b. Update any record
 - c. Delete record
 - d. Alter table
 - e. drop table
 3. Use any tables and do select operations using Operators.
 4. Use any tables and do select operations using different clauses, a. where b. group by c. order by etc
 5. Use any tables and do select operations using different aggregate functions.
 6. Use any tables and do sub queries and join operator.
 7. Use any tables and do select operations using different string functions.
 8. To show the table Index, View on existing table
 9. Create PL Block

- a. To check even odd number
- b. To print sum up to limit

BCSET-203: Linux Operating System

Course Objectives:

- 1. To study the concepts of Operating System
- 2. To understand Linux commands.
- 3. To Study VEditor Concepts
- 4. To Understand Shell Programming

Unit I: Introduction to Operating System (9)

Basics of Unix., Introduction to Linux , Comparison of Linux with Windows operating system. , Architecture of Linux , Login, Logout, Shell, Kernel, GPU Commands (cal, date, whoetc) ,

Unit II:Linux Commands (9)

Directory management(mkdir, cd, rmdir) ,File handling using Linux commands, commands –ls, cat,cp,mv,rm , Types of files, chmod command, Basic filter- head, tail,sort,grep

Unit-III : Veditor (9)

Editor, Use of VI , Features of VI , Vi basics , different modes and working with VI, Command mode -cursor movements(k,j,h,l), delete(character, line, word), Screen up , down use of repeat factor , joining lines (J) , Input mode- switching with (I,o,r,s,a,I,O,R,S,A) , ex mode – saving (w, x, q) , writing selecting lines to another file. , searching for pattern (/ and ?), Search and replace

Unit III: Shell Programming (9)

Concept of Shell scripting, Conditional statements-if, if else, case. ,looping-for, while, until, Continue and break statement. read, echo statement, Writing and executing shell script

Course Outcomes:

1. To get knowledge of Operating System.
2. To use Linux Commands
3. To use VI Editor
4. To implement Shell Programming.

References Book

- 1) Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Operating System Principles (Replica Press Pvt. Ltd. 2006)
- 2) Sumitabha Das, UNIX : Concepts and Applications (Europe, Mcgraw Hill Education, 2017) (Page No. Unit 1: 4 to 19, Unit 2: 22 to 59, 83 to 102, Unit 4: 193 to 209)

BCSET204 : Network Security

Course Objectives:

1. To study the concepts of Security
2. To understand Cryptographic Techniques.
3. To Study Public Key Cryptographic Concepts
4. To Understand Network Security

Unit – I: Introduction To Concepts Of Security (8)

Introduction, Need of security, Security approaches, Principles of security, Types of attack, Security Services-access control, Firewall and proxy services-introduction, Digital signatures, Electronic documents

Unit – II: Cryptographic Techniques (10)

Introduction, plain text and cipher text, Substitution techniques, Transposition techniques, Encryption and Decryption, Symmetric and Asymmetric key cryptography

Unit – III: Public Key Cryptography (10)

Need and Principles of Public Key Cryptosystems, RSA Algorithm, Key Distribution and Management, Diffie-Hellman Key Exchange, Digital Signatures

Unit – IV: Network Security (8)

Firewalls ,IP Security, VPN ,Intrusion Detection . Web Security, SSL ,TL

Course Outcomes:

1. To get knowledge of Concept of Security.
2. To get knowledge of Cryptographic Techniques.
3. To use Public Key Cryptographic Concepts
4. To use Network Security

Reference Book :

- 1) Williams Stallings – Cryptography and Network security principles and practices. Pearson Education (LPE)
- 2) Atul Kahate (TMGH) Cryptography and network security
- 3) Schneir, Bruce, “Applied Cryptography : Protocols and Algorithms”

LABIII: BCSEP-212: Based on BCSET 203 &BCSET 204

Group A:BCSET 203

Course Objectives: -

1. To understand Linux commands.
2. To Study Vieditor Concepts
3. To Understand Shell Programming
4. To Understand Network Security

- Q1. Demonstration of GUI of linux
- Q2.Study of directory management commands
- Q3. Study of file management commands
- Q4. Study of basic commands of VI editor
- Q5. Write a shell script to display table of given number

Group B:BCSET 204

- Q1. Demonstration of firewall and proxy servers
- Q2.Demonstration of Web security
- Q3. Demonstration of IP Security
- Q4. Demonstration of digital signature
- Q5. Demonstration of attacks

Course Outcomes:

To understand Linux Commands

1. To understand VI Editor
2. To understand Network Security

BCSET- 205: Digital Electronics

Course Objectives: -

- i. To understand number representation and conversion between different representation in digital.
- ii. To learn Boolean algebra and logic gates.
- iii. To understand designing and analyzing attitude about sequential circuits.
- iv. To learn designing and analyzing attitude about Combinational circuits.

UNIT I: Number System and Logic Gates (10)

Decimal, Binary, Hexadecimal Number system. Interconversion from one system to Another, BCD code, ASCII code, binary arithmetic, 1's complement and 2's complement. Logic gates-AND, OR, NOT, NOR, NAND, EX-OR (Symbol, Expression and Truth Table) DeMorgan's theorem and Universality of logic Gates; K-map. Introduction to logic families: TTL NAND gate.

UNIT II: Sequential circuits (9)

Latch, Flip Flops-RS Flip flop, Clocked RS Flip flop, D Flip flop, JK Flip flop, T Flip flop, Counters- 3 bit asynchronous, 3bit synchronous, Shift registers: SISO, SIPO, PISO, PIPO.

UNIT III: Combinational Circuits (8)

Half adder, Full adder, Half subtractor, Full Subtractor, Parallel adder, Encoder, Decoder, Multiplexer and De-Multiplexer.

UNIT IV: Memory Organization & I/O Devices (9)

Introduction of Computer, Concept of Bus, Computer I/O devices, Memory, RAM, SRAM, DRAM, ROM, PROM, EPROM, EEPROM, FLASH, Arithmetic logic unit. Printers, Classification of Printers.

Reference Books:

1. M. Morris Mano, Digital System Design (Delhi:Pearson Education,2010)(Page No.: Unit I: 1-27, 37-40, 54, Unit II: 119-141, Unit III: 172-180, 217-239, Unit IV: 255-283)

2. Thomas L. Flyod, Digital Fundamentals (Delhi:Pearson Education,1994) (**Page No.:** Unit I: 28-64, 89-109, 132-142, Unit II: 156-169, 222-264, Unit III: 292 - 312, 327-362, 383-403, Unit IV: 422-457)

3. W. H. Gothmann, Digital Electronics: An Introduction To Theory And Practice, (Delhi: Prentice Hall of India,2000) (**Page No.:** Unit I: 18-36, 70-81, Unit II: 241, 254, Unit III: 261-270, Unit IV: 278- 290)

4.R. L. Tokheim, Digital Principles, (New Delhi: Tata McGrawHill,1994) (**Page No.:** Unit I: 21-27, 31-38, 43-47, 57-60, 77, 122-125, Unit II: 64-67, 125-130, 231-239, Unit III: 154-160, 209-213, Unit IV: 260-281)

Course Outcomes: -

Students will be able to:

- i. Convert any number from one number system to any other number system.
- ii. Design and construct logic gates.
- iii. Design and analyze sequential and combinational circuits.
- iv. Analyze the computer system.

BCSET-206 Graph Theory and Calculus

Course Objectives:

- i. To understand concept of graphs, directed graphs and weighted graphs
- ii. To learn the rule of graph workflow.
- iii. To understand and apply graph algorithms
- iv. To understand the concept of successive derivative

Unit –1 : Graphs and operations on graphs (10)

Definition and elementary results, Types of graphs ,Isomorphism ,Matrix representation of graphs : Adjacency matrix and incidence matrix, Subgraphs and induced graphs Complement of a graph, Self complementary graphs, Union, intersection of graphs, Ring sum of two graphs

Unit –2 Connected Graphs and Trees (10)

Definitions: walk, trail, tour, path and circuit,Definitions of connected, disconnected graphs, Dijkstra's shortest path algorithm, Definition of Euler's and

Hamilton Graph and Example.

Tree : Definition , Properties of Tree, Center of a tree, Spanning tree: Definition and examples, Fundamental circuit and cut-set : Definition, Binary trees and elementary results, Kruskal's algorithm.

Unit -3 : Directed Graphs (8)

Definition, types of directed graphs, Directed (rooted) trees, arborescence and Polish notation, Isomorphism of digraphs, Connectedness in digraphs, Euler digraph, Network and flows:Definition, examples., Maximal flow algorithm.

Unit -4 Successive Differentiation (8)

nth derivatives of some standard functions., Leibnitz's Theorem (without proof) and examples. L'Hospital's Rule (without proof) and examples' Lagrange's Mean Value theorem(with proof) and its geometric significance and examples.

Course Outcomes:

- i. Analyze concepts of Graph and types of graphs
- ii. Apply concepts of algorithms of graphs
- iii. Construct transportation network using directed graph
- iv. Evaluate derivatives of some standard functions

Text book:

1. S.R.Patil and others, A Text book of Discrete mathematics (India: NIRALI Prakashan, 2008) 6.1-10.31
2. S.R.Patil and others, A Text book of Algebra and Calculus (India: NIRALI Prakashan, 2008).Unit 4: 4.8-5.2

Reference Books:

1. Narsing Deo, Graph Theory with Applications to Computer Science and Engineering (India: Prentice Hall, 1974), Unit 1:1-30, Unit 2: 39-61 , Unit 3: 194- 206
2. U.Langote, Discrete Mathematics (Pune: Tech-Max Publications, 2009), Unit 1: 6.1-7.3 , Unit 2: 8.1-9.5 , Unit 3:10.1-10.4

BCSET-207: Statistical Methods I

Course Objectives:-

- i. To learn fundamental concepts Probability with an examples.
- ii. To learn the Theorems on probability.
- iii. To learn the conditional of probability.

iv. To learn the concepts of standard discrete probability distribution.

Unit-1 Probability: (9)

Idea of permutation and combination, concept of experiments and random experiments, Definitions: sample space, discrete sample space, continuous sample space, events, types of events, power set (sample space consisting at most 3 sample points), Illustrative examples, Classical (apriori) definition of probability of an event, equiprobable sample space, simple examples of probability of an events based on permutations and combinations, axiomatic definition of probability, Theorems on probability: i) $P(\Phi) = 0$ ii) $P(A') = 1 - P(A)$ iii) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ iv) If $A \subseteq B$, $P(A) \leq P(B)$ v) $0 \leq P(A \cap B) \leq P(A) \leq P(A \cup B) \leq P(A) + P(B)$, examples.

Unit-2 Conditional Probability and Independence of Events: (10)

Definition of conditional probability of an event, examples, Partition of sample space, Baye's theorem (only statement), concept of prior and posterior probability and examples, concept of independence of two events, examples, Proof of the result that if A and B are independent events then i) A and B' ii) A' and B iii) A' and B' are also independent, Pairwise and complete independence of three events, examples.

Unit-3 Univariate Discrete Probability Distribution: (9)

Definitions: discrete random variable, probability mass function (p.m.f.), cumulative distribution function (c.d.f.), properties of c.d.f., median, mode, p.g.f. and examples, Definition of expectation of a random variable, expectation of a function of random variable, variance. Results on expectation: i) $E(c) = c$, where c is constant, ii) $E(aX + b) = a E(X) + b$, where a and b are the constants, Examples.

Unit-4 Some Standard Discrete Probability Distributions: (8)

Discrete uniform distribution: p.m.f., mean and variance, examples., Binomial distribution: p.m.f., mean, variance, additive property of binomial variates, recurrence relation for probabilities, examples, Poisson distribution: p.m.f., mean and variance, additive property, recurrence relation for probabilities, Poisson distribution as a limiting case of binomial distribution (without proof), examples.

Reference Books:-

1. Amir D. Aczel, Jayavel Sounderpandian. Complete Business Statistics, (6th Edition), New Delhi, Tata MacGraw-Hill Publishing Company Ltd., 2006. (Unit-1: 74-84, Unit-2: 86-99, Unit-3: 117-128, Unit-4: 139-141, 150-152)

2. S. C. Gupta. Fundamental of Statistics (7th Edition), Mumbai, Himalaya Publishing House, 2018.

(Unit-1: 12.1-12.22, Unit-2: 12.23-12.53, Unit-3: 13.1-13.4, Unit-4: 14.1-14.29)

3. D.N. Elhance, Veena Elhance, B. L. Agarwal, Fundamental of Statistics Alhabad, Kitab Mahal Publication, 1956.

(Unit-1: 17.1-17.8, Unit-2: 17.9-17.44, Unit-4: 18.1-18.16)

4. Murray R. Spiegel, Larry J. Stephens, Statistics (4th Edition), New Delhi, Tata MacGraw-Hill Publishing Company Ltd., 2010.

(Unit-1: 6.1-6.4, 6.5, 6.7, 6.10, Unit-2: 6.2, Unit-3: 7.1, 7.3, 7.6)

5. J.E. Freund, Mathematical Statistics with Applications, (4th Edition), London, Pearson Publication, 2014.

(Unit-1: 23-34, Unit-2: 40-53, Unit-3: 69-72, Unit-4: 164, 165, 179, 190)

Course Outcomes:

- i) To define sample space, event, probability etc.
- ii) To compute probabilities by using definition and probability rules.
- iii) To study conditional probability and independent event.
- iv) To define random variable, p.m.f., distribution function etc.
- v) To compute probabilities by using discrete probability distributions.

BCSEP-213: LAB IV-Based on BCSET: 205, BCSET: 206 and BCSET: 207

Group A :Based on BCSET: 205

Course Objectives: -

- i) To learn logic gates and verify De-Morgan's theorem.
- ii) To understand the concept of Flip-Flops.
- iii) To learn different adders.
- iv) To Understand multiplexer and De-multiplexer.

Practical Set

1. Study of Logic Gates.

2. Basic gates using NAND gate.
3. Basic gates using NOR gate.
4. Study and Verify De-Morgan's Theorem.
5. Study of Half Adder.
6. Study of Full Adder.
7. Study of Multiplexer using IC 74153.
8. Study of De-multiplexer using IC 74153.
9. Study of RS Flip-Flop.
10. Study of JK Flip-Flop.
11. Design n-bit asynchronous counter using Flip-Flop ICs.
12. Study of CPU and I/O devices.

Course Outcomes: -

Students should demonstrate their ability to:

- i. Design and analyze sequential logic circuits.
- ii. Design and analyze combinational logic circuits.
- iii. Use logic gates in applications.
- iv. Design and analyze various n bit counters.

Group B Based on BCSET: 206

Practical

Course Objectives:-

- i. To study the applications of graph algorithm
- ii. To study representation of mathematical expression in Polish notation
- iii. To study the rule of differentiation with example

Student should explain and verify

1. Kruskal's algorithm with example
2. Dijkstra's Shortest path algorithm
3. Fundamental circuit and fundamental cut set
4. Polish Notation and Arborescence
5. Ford Fulkerson Algorithm
6. Examples of L'Hospital's Rule

- 7.Examples of Leibnitz's Rule
8. Examples of Lagrange's Mean Value Theorem

Course Outcomes:

- i. Analyze various graph algorithms
- ii. Represent mathematical expression in Arborescence and Polish notation
- iii. Apply L'Hospital Rule and Leibnitz's Rule to functions.

Group C Based on BCSET: 207

Course Objectives:

- i) To study the concept of probabilities.
- ii) To Understand the Probability distributions.
- iii) Student will able to fit various Probability distributions.
- iv) To draw and analyses model sample for various distributions.

- 1) Computation of probability.
- 2) Computation of Conditional probability.
- 3) Computation of Independence of probability.
- 4) Computation of probability on Baye's Theorem.
- 5) Fitting of Binomial distribution.
- 6) Fitting of Poisson distribution.
- 7) Model sampling from Binomial distribution.
- 8) Model sampling from Poisson distribution.

Course Outcomes:

- i) To compute probabilities.
- ii) To fit various statistical distributions.
- iii) To draw and analyses model sample for various distributions.
- iv) To draw and interpreted the shape of discrete probability distributions.
- v) To exhibit critical and creative thinking skills for analysis and evaluation of problems.
- vi) To demonstrate MS-Excel.