

B.Sc. Computer Science (Entire)

Under the Faculty of Science and Technology

Choice Based Credit System

(CBCS)

Regulations in accordance with National Education Policy to be implemented from
Academic Year 2022-23

1. Implementation of Revised guidelines and rules: The revised guidelines and rules shall be implemented gradually as mentioned below:

Level	Programme	Course	From Academic Year
Undergraduate Programme:			
Level 5	Undergraduate Certificate (One year or two semesters)	Part-I	2022-23
Level 6	Undergraduate Diploma (Two years or four semesters)	Part-II	2023-24
Level 7	Bachelor's Degree (Three years or six semesters)	Part-III	2024-25
Level 8	Bachelor's Degree with Honors /Research (Four years or eight Semesters)	Part-IV	2025-26

(If the candidate want to exit after a certain level, the Awards after completing specific level will be: Under graduate Certificate in Science, Undergraduate Diploma in Science, B.Sc. Computer Science (Entire) And B.Sc. Computer Science (Entire) (Hon./Research) for Level-5, Level- 6, Level-7 and Level-8 respectively. Other provisions for multiple entry and exit as per the Institute's rules and regulations are applicable).

2. Eligibility Criteria:

Candidate should have passed standard XII (10+2) in Science Stream or government approved equivalent diploma in Engineering/ Technology from any recognized Technical Board.

A candidate who has completed qualifying qualification from any Foreign Board /University must obtain an equivalence certificate from Association of Indian Universities (AIU).

3. Pattern of Programme: Combination of internal assessment and semester-end examination for B.Sc. Computer Science (Entire) will be 40:10 pattern shall be applicable for each theory paper in each semester wherein 40 marks shall be for Institutional (An Autonomous College- Affiliated Shivaji University, Kolhapur) Semester end examination and 10 marks for internal assessment except Environmental Studies. Only for Environmental Studies in Semester IV, 70 marks shall be for University examination for theory paper and 30 marks for project work.

4. Weightage: There shall be Three Year B.Sc. Computer Science (Entire) Program with **160 Credits**. The candidate wish to exit with three years Degree Program Bachelor of Computer Science (Entire) (with the completion of courses equal to minimum of 160 credits).or The candidate wish to continue studies for Four Year B.Sc. Computer Science (Entire) (Hon./Research) may opt for 4th year which will have 26 credits for Sem VII and 26 credits for Sem VIII, total 52 credits for 4th year, out of them (4*2+4*4=24) credits for Discipline Specific Elective Courses (DSE) and 02 credits for SBC-7 of Sem VII.

Program will require 160 credits. (Please refer the university regulations and structure of the program for details).

S E M	Discipline Specific Core Courses (DSC)(L+P)(Credits)	Discipline Specific Elective Courses (DSE)(L+P)(Credits)	Ability Enhancement Compulsory Courses (AECC) (L+P) (Credits)	Skill Enhancement Courses(SEC)		Total Credits
				Vocational Courses(L+P) (Credits) (Non CGPA)	Value Based Courses (P) (Credits) (Non-CGPA)	
I	Computer Science (Entire) (8 x 2=16) 2 credits for each Theory Subject (4 x 2=8) 2 credits for each Practical Subject	Non-CGPA-I	AECC-A (4) English For communication -I	SEC-I (2) Democracy, Election & Good Governance	VBC-I	22+8=30
II	Computer Science (Entire) (8 x 2=16) 2 credits for each Theory Subject (4 x 2=8) 2 credits for each Practical Subject	Non-CGPA-II	AECC-B (4) English For communication -II	SEC-II(2) Constitution of India and Local Self Government	-	22+8=30
Total						60
Level 5: Exit with Certificate Course in Computer Science (Entire) (with the completion of courses equal to minimum of 52 60 credits)						
III	Computer Science (Entire) (6 x 2=12) 2 credits for each Theory Subject (3 x 4=12) 4 credits for each Practical Subject	--	--	SBC-III (2) Multidisciplinary	--	14+12=26

IV	Computer Science (Entire) (6 x 2=12) 2 credits for each Theory Subject (3x 4=12) 4 credits for each Practical Subject	--	AECC D(4) Environmental Studies	SBC-IV (2) Multidisciplinary	-	18+12=30
Total						56
Level 6:Exit with Diploma in Computer Science (Entire) (with the completion of courses equal to minimum of 116 credits)						

V	Computer Science (Entire) (4 x 2=8) 2 credits for each 4 Theory Subject (3 x 2=6) 2 credits for each Practical Subject (1 x 2=2) 2 credits for Project	Constitution of India & Local Self Government : Non-CGPA	AECC E(4) English For communication-III	SBC-V (2) Multidisciplinary	--	14+6+2=22
VI	Computer Science (Entire) (4 x 2=8) 2 credits for each 4 Theory Subject (3 x 2=6) 2 credits for each Practical Subject (1 x 2=2) 2 credits for Project	Professional Communication (Eng.)Non-CGPA	AECC F(4) English For communication-IV	SBC-VI (2) Multidisciplinary	-	14+6+2=22
Total						
	128	-	20	11 (Non CGPA)		01 (Non CGPA)

Level 7 : Exit with three years Bachelor of Computer Science(Entire) (with the completion of courses equal to minimum of 160 credits or continue studies for Bachelor of Computer Science(Entire) With (Honors/Research) four year Degree Programme (with the completion of courses equal to minimum of 160 credits)

VII	Computer Science (Entire) (4 x 4=16) 4 credits for each Theory Subject (2 x 4=8) 4 credits for each Practical Subject	-	-	SBC- 7(2) Multidisciplinary	-	26
VII I	Computer Science (Entire) (4 x 4=16) 4 credits for each 4 Theory Subject (2 x 4=8) 4 credits for each Practical Subject	-	-	SBC- 8(2) Multidisciplinary	-	26
Total						52
	176	-	20	16 (Non CGPA)	02 (Non CGPA)	212

Level 8: Exit with four years Bachelor of Computer Science (Entire) with (Honors/Research) (with the completion of courses equal to minimum of 212 credits).

Note:1. For first year Sem-I, students have eight DSC courses available at their respective colleges. Same eight courses they have to continue for Sem-II.

2. For second year Sem III, students have six DSC courses. Same six courses they have to continue For Sem- IV.

3. For third year Sem–V, students have four DSC course. Same course they have to continue for Sem-VI.

4. For semesters V& VI there shall be four DSE courses(papers) for each semester.

5. Students can exit after Level 5 with Certificate Course in Computer Science (Entire) (with the completion of courses equal to minimum of 60 credits).

6. Students can exit after Level 6 with Diploma in Computer Science (Entire) (with the completion of courses equal to minimum of 116 credits).

7. Students can exit after Level 7with Bachelor of Computer Science (Entire) (with the completion of courses equal to minimum of 160 credits).

8. SBC: Skill Based Courses (2 credits). Students have to select one for each semester from the pool of courses available at their respective colleges.

9. VBC: Value Based Course (1Credit). Students have to select one course for only for semester-I from the pool of courses available at their respective colleges.

B.Sc. Computer Science (Entire) Part-I
List of Discipline Specific Core (DSC) Courses
Sem- I

Sr. No.	Course Code	Subject Code (OLD)	Subject Code (NEW)	Paper Number	Subject Name
1.	DSC-101	BCSE22-101	BCSE22-101	Computer Science Paper-I	Fundamentals of Computer-I
2.	DSC-102	BCSE22-102	BCSE22-102	Computer Science Paper-II	Programming in C Part-I
3.	GEC-103	BCSE22-107	BCSE22-103	Electronics Paper-I	Electronic Devices and Circuits-I
4.	GEC-104	BCSE22-108	BCSE22-104	Electronics Paper-II	Digital Electronics-I
5.	GEC-105	BCSE22-103	BCSE22-105	Mathematics Paper-I	Discrete Mathematics
6.	GEC-106	BCSE22-104	BCSE22-106	Mathematics Paper-II	Algebra
7.	GEC-107	BCSE22-105	BCSE22-107	Statistics Paper-I	Descriptive Statistics-I
8.	GEC-108	BCSE22-106	BCSE22-108	Statistics Paper-II	Probability Theory and Discrete Probability Distributions
9.	AECC-A	BCSE22-109	BCSE22-109	English Paper-I	English for Communication-I
10.	SEC-I (VBC-I)	1111	1111	—	Democracy, Elections and Good Governance

- **Note: Practical examination will be conducted annually.**
 - **DSC:** Discipline Specific Core Course
 - **GEC:** Generic Elective Course :Three Courses (Electronics, Mathematics and Statistics)
 - **AECC :** Ability Enhancement Compulsory Course
 - **SEC-I (VBC-I):** Democracy, Elections and Good Governance
 - **Short Term Course- Computer Hardware and Networking**
 - **Link for the pool of SEC courses from National Skills Qualification Framework (NSQF)**
 - (You may add or delete any courses as per available facilities)
- https://drive.google.com/file/d/176Vwvx4SC2ONrt69XADruzI2qnfBPI_o/view?usp=sharing

List of Discipline Specific Core (DSC) Courses Sem-II

Sr. No.	Course Code	Subject Code (OLD)	Subject Code (NEW)	Paper Number	Subject Name
1.	DSC-201	BCSE22-201	BCSE22-201	Computer Science Paper-III	Linux Operating System
2.	DSC-202	BCSE22-202	BCSE22-202	Computer Science Paper-IV	Programming in C Part-II
3.	GEC-203	BCSE22-207	BCSE22-203	Electronics Paper-III	Electronic Devices and Circuits-II
4.	GEC-204	BCSE22-208	BCSE22-204	Electronics Paper-IV	Digital Electronics-II
5.	GEC-205	BCSE22-203	BCSE22-205	Mathematics Paper-III	Graph Theory
6.	GEC-206	BCSE22-204	BCSE22-206	Mathematics Paper-IV	Calculus
7.	GEC-207	BCSE22-205	BCSE22-207	Statistics Paper-III	Descriptive Statistics-II
8.	GEC-208	BCSE22-206	BCSE22-208	Statistics Paper-IV	Continuous Probability Distributions and Testing of Hypothesis
9.	AECC-B	BCSE22-209	BCSE22-209	English Paper-II	English for Communication-II
10	SEC-II (VBC-II)	2222	2222	--	Constitution of India and Local Self Government
Practicals					
11.	DSC P1	BCSE22-210	BCSE22-210	--	Lab Course-I : Computer Science
12.	GEC P2	BCSE22-213	BCSE22-211	--	Lab Course-II : Electronics
13.	GEC P3	BCSE22-211	BCSE22-212	--	Lab Course-III : Mathematics
14.	GEC P4	BCSE22-212	BCSE22-213	--	Lab Course-IV : Statistics

Note: Practical examination will be conducted annually.

Short Term Course- Web Designing

SEC-II (VBC-II): Constitution of India and Local Self Government

SADGURU GADAGE MAHARAJ COLLEGE, KARAD.

(An Autonomous College - Affiliated to Shivaji University, Kolhapur)

Accredited A⁺ with CGPA 3.63 by NAAC; RUSA Beneficiary and NAAC Designated Mentor College

Website: www.sgm.edu.in

Estd.: 1954

SGM/SCIENCE/BOS/COMPUTER SCIENCE

Date:

To,

The Principal,

Sadguru Gadage Maharaj College, Karad

An Autonomous College- Affiliated to Shivaji University, Kolhapur

Subject: Regarding syllabi of B.Sc. Computer Science (Entire), B.Sc. Computer Science (Optional) and M.Sc. Computer Science (NEP-2020) a degree program under the faculty of Science and Technology as per National Education Policy, 2020.

Respected Sir,

With reference to the subject mentioned above, I am directed to inform you that the Academic Council of Sadguru Gadage Maharaj College, Karad have accepted and granted approval to the **Syllabi and Nature of question paper of B.Sc. Computer Science (Entire), B.Sc. Computer Science (Optional) and M.Sc. Computer Science (NEP-2020)** System under the faculty of Science and Technology as per National Education Policy, 2020.

Sr. No.	Faculty of Science and Technology	Programme/ Course
1.	Computer Science	B.Sc. Computer Science (Entire) - I
		B.Sc. Computer Science (Optional) - I
		M.Sc. Computer Science - I

This Syllabi and Nature of question paper of B.Sc. Computer Science (Entire), B.Sc. Computer Science (Optional) and M.Sc. Computer Science shall be implemented from the Academic Year 2022-23 onwards. A soft copy containing the syllabi is attached here with and it is also available on college website www.sgm.edu.in.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking You,

Yours Faithfully,

**Chairman,
BOS in Computer
Science (Entire)**

Rayat Shikshan Sanstha's
SADGURU GADAGE MAHARAJ COLLEGE, KARAD.
(An Autonomous College - Affiliated to Shivaji University, Kolhapur)

Accredited By NAAC with A⁺ Grade (CGPA 3.63)

National Education Policy (NEP-2020)

Syllabus for

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

Computer Science

Syllabus to be implemented from AUGUST 2022 onwards of

Academic Year 2022-23

Rayat Shikshan Sanstha's
SADGURU GADAGE MAHARAJ COLLEGE, KARAD.
(An Autonomous College - Affiliated to Shivaji University, Kolhapur)
Department of Computer Science (Entire)
B.Sc. Computer Science (Entire) Part- I
Course Structure NEP-2020 w.e.f. August 2022

Note: The following in a nutshell gives the scope and extent of each course offered. Each core theory course has two levels of teaching: Lectures and Practical's.

SEM-I				SEM-II			
Course Code	Subject Code	Subject Name	Credits	Course Code	Subject Code	Subject Name	Credits
DSC-101	BCSE22-101	Fundamentals of Computer-I	2	DSC-201	BCSE22-201	Linux Operating System	2
DSC-102	BCSE22-102	Programming in C Part-I	2	DSC-202	BCSE22-202	Programming in C Part-II	2
GEC-103	BCSE22-103	Electronic Devices and Circuits-I	2	GEC-203	BCSE22-203	Electronic Devices and Circuits-II	2
GEC-104	BCSE22-104	Digital Electronics-I	2	GEC-204	BCSE22-204	Digital Electronics-II	2
GEC-105	BCSE22-105	Discrete Mathematics	2	GEC-205	BCSE22-205	Graph Theory	2
GEC-106	BCSE22-106	Algebra	2	GEC-206	BCSE22-206	Calculus	2
GEC-107	BCSE22-107	Descriptive Statistics-I	2	GEC-207	BCSE22-207	Descriptive Statistics-II	2
GEC-108	BCSE22-108	Probability Theory and Discrete Probability Distributions	2	GEC-208	BCSE22-208	Continuous Probability Distributions and Testing of Hypothesis	2
AECC-A	BCSE22-109	English for Communication-I	4	AECC-B	BCSE22-209	English for Communication-II	4
SEC-I (VBC-I)	1111	Democracy, Elections and Good Governance	2	SEC-II (VBC-II)	2222	Constitution of India and Local Self Government	2
Practical Examination is Annual				Practicals			
DSC P1	BCSE22-210	Lab Course-I : Computer Science	2	DSC P1	BCSE22-210	Lab Course-I : Computer Science	2
GEC P2	BCSE22-211	Lab Course-II : Electronics	2	GEC P2	BCSE22-211	Lab Course-II : Electronics	2
GEC P3	BCSE22-212	Lab Course-III : Mathematics	2	GEC P3	BCSE22-212	Lab Course-III : Mathematics	2
GEC P4	BCSE22-213	Lab Course-IV : Statistics	2	GEC P4	BCSE22-213	Lab Course-IV : Statistics	2
Total of SEM-I			30	Total of SEM-II			30
Total Credits of SEM-I and SEM-II =30+30=60							

**Choice Based Credited System with Multiple Entry and Multiple Exit to be implemented from
Academic Year: 2022-23**

**First Year Bachelor of Science (Level-5) Program Structure (NEP-2020 PATTERN)
SEMESTER-I**

Program					Teaching Scheme					Examination Scheme										
B.Sc. Computer Science (Entire) Part-I					Theory			Practical		Theory				Practical		(T+P)				
Courses	Semester	Sr. No.	Course Code	Subject Code	No. of Credits	No. of Lectures.	Hours	No. of Credits	No. of Lectures	Hours	Hours	Max. Marks (Theory)	Max. Marks (Internal)	Total Marks	Min. Marks	Hours	Max. Marks	Min. Marks	Total Marks	
CGPA	Semester-I	1	DSC-101	BCSE22-101	2	3	2.4	02	04	3.2	02	40	10	50	20=16+4	Annual Practical Examination	500			
		2	DSC-102	BCSE22-102	2	3	2.4				02	40	10	50	20=16+4					
		3	GEC-103	BCSE22-103	2	3	2.4	02	04	3.2	02	40	10	50	20=16+4					
		4	GEC-104	BCSE22-104	2	3	2.4				02	40	10	50	20=16+4					
		5	GEC-105	BCSE22-105	2	3	2.4	02	04	3.2	02	40	10	50	20=16+4					
		6	GEC-106	BCSE22-106	2	3	2.4				02	40	10	50	20=16+4					
		7	GEC-107	BCSE22-107	2	3	2.4	02	04	3.2	02	40	10	50	20=16+4					
		8	GEC-108	BCSE22-108	2	3	2.4				02	40	10	50	20=16+4					
		9	AECC-A	BCSE22-109	4	4	3.2	-	-	-	02	40	10	50	20=16+4					
		10	SEC-I (VBC-I)	1111	2	4	4	-	-	-	-	-		50	20					
Credit					22	32	26.4	8	16	12.8	-	-		500	-					
Total Credit(A)					22(T)+ 8(P)=30					-	-		-	-						

SEMESTER-II

Program					Teaching Scheme						Examination Scheme									
B.Sc. Computer Science (Entire) Part-I					Theory			Practical			Theory					Practical			(T+P)	
Courses	Semester	Sr. No.	Course Code	Subject Code	No. of Credits	No. of Lectures	Hours	No. of Credits	No. of Lectures	Hours	Hours	Max. Marks (Theory)	Max. Marks (Internal)	Total Marks	Min. Marks	Hours	Max. Marks	Min. Marks	Total Marks	
CGPA	Semester-II	1	DSC-201	BCSE22-201	2	3	2.4	02	04	3.2	02	40	10	50	20=16+4	3.2	100	40	500+400=900	
		2	DSC-202	BCSE22-202	2	3	2.4				02	40	10	50	20=16+4					
		3	GEC-203	BCSE22-203	2	3	2.4	02	04	3.2	02	40	10	50	20=16+4	3.2	100	40		
		4	GEC-204	BCSE22-204	2	3	2.4				02	40	10	50	20=16+4					
		5	GEC-205	BCSE22-205	2	3	2.4	02	04	3.2	02	40	10	50	20=16+4	3.2	100	40		
		6	GEC-206	BCSE22-206	2	3	2.4				02	40	10	50	20=16+4					
		7	GEC-207	BCSE22-207	2	3	2.4	02	04	3.2	02	40	10	50	20=16+4	3.2	100	40		
		8	GEC-208	BCSE22-208	2	3	2.4				02	40	10	50	20=16+4					
		9	AECC-B	BCSE22-209	4	4	3.2	-	-	-	02	40	10	50	20=16+4	-	-	-		
		10	SEC-II (VBC-II)	2222	2	4	4	-	-	-	-	-	-	50	20	-	-	-		
		Credit					22	32	26.4	8	16	12.8	-	-	500	20	12.8	400		-
		Total Credit(B)					22(T)+ 8(P)=30					-	-	-	-	-	-	-		-
Grand Total					30(Sem-I)+30(Sem-II)=60 Credits					500(Sem-I)+900(Sem-II)=1400 Total Marks										

B.Sc. Computer Science (Entire) Structure

Levels	Sem.	DSC	DSE/OEC/GE C/IDS	AECC Languages And Env. Sci.	SEC (Multidisciplinary)	Total Credits
Level-5	I	$(2X2)+(1X2)$ =6 (DSC)	$(6X2)+(3X2)$ =18 (GEC)	1X4=4 (ENG)	SEC-I (VBC-I) (2)	30
	II	$(2X2)+(1X2)$ =6 (DSC)	$(6X2)+(3X2)$ =18 (GEC)	1X4=4 (ENG)	SEC-II (VBC-II) (2)	30
Level-6	III	$(2X2)+(1X4)$ =8 (DSC)	$(4X2)+(2X4)$ =16 (GEC)	-	SEC-III (2)	26
	IV	$(2X2)+(1X4)$ =8 (DSC)	$(4X2)+(2X4)$ =16 (GEC)	1X4=4 (EVS)	SEC-IV (2)	30
Level-7	V	$(4X2)+(3X2)$ +(1X2)=16 (DSC)	-	1X4=4 (ENG)	SEC-V (2)	22
	VI	$(4X2)+(3X2)$ +(1X2)=16 (DSC)	-	1X4=4 (ENG)	SEC-VI (2)	22
Level-8	VII	$(4X4)+(2X4)$ =24	-	-	SEC-VII (2)	26
	VIII	$(4X4)+(2X4)$ =24	-	-	SEC-VIII (2)	26
Total Credits						212

List of Value Based Courses: VBC-I (Already existing in our Syllabus)

Sr. No.	Subject	Name of the Course	MoU	Duration
1	Chemistry	Soil & Water Analysis		6 Months
2	Physics	Instrumentation Measurement Analysis		6 Months
3	Mathematics	Basic Computer Education		6 Months
4	Statistics			
5	Zoology	Sericulture		6 Months
6	Botany	Bio-Prospecting of Medical & Aromatic Plants		6 Months
7	Electronics	Electronic circuit Designing and Repairing		6 Months
8	Comp. Science	Comp. Hardware		6 Months
9	Comp.Applications	Comp. Hardware		6 Months
10	Microbiology	Fermentation & Alcohol Technology		6 Months
11	Inform. Technology	Advanced Excel		6 Months
12	Biotechnology	Research Methodology		6 Months

List of Skill Enhanced Courses: SEC

(S. U. K. Prescribed for the Syllabus)

List of Skill Based Courses (SBC) & Value Based Courses (VBC):

Sr. No.	Name of the Qualification Certificate Course	Sector
1	Electrical Winder	Electrical
2	Electrician Domestic	Electrical
3	Electrician Industrial	Industrial Electrical
4	Electrician Transmission Line	Electrical
5	Operator Cnc Turning	Production & Manufacturing
6	Arc And Gas Welder	Fabrication
7	Tig Welder	Fabrication
8	Pipe Welder (Tig & Mmaw)	Fabrication
9	Co2 Welder	Fabrication
10	Welder (Repair & Maintenance)	Fabrication
11	Sheet Metal Worker (Panels, Cabins & Ducts)	Fabrication
12	Operator Conventional Turning	Production & Manufacturing
13	Operation And Maintenance Of Clinical Equipment	Electronics
14	Repair And Maintenance Of Domestic Electronic Appliances	Electronics
15	Operation, Installation And Maintenance Of Ecg & Iccu Instruments	Electronics
16	Repair And Maintenance Of Office Electronic Equipment	Electronics
17	Repair And Maintenance Of Personal Electronic Devices	Electronics
18	Operation, Installation And Maintenance Of Physiotherapy Equipment	Electronics
19	Operation And Maintenance Of X-Ray Machine & Darkroom Assistance	Electronics
20	Basic Automotive Servicing Of Two And Three Wheelers (Assistant Motor Cycle Mechanic)	Automotive Repair
21	Basic Automotive Servicing Of Four Wheelers (Assistant Motor vehicle Mechanic)	Automotive Repair
22	Driver Cum Mechanic	Automotive Repair
23	Food Techniques	Food Processing & Preservation
24	Food Industry By-Products And Waste Utilization	Food Processing & Preservation
25	Food Packaging And Labelling	Food Processing & Preservation
26	Manufacturing Of Extruded Products	Food Processing & Preservation
27	Meat And Meat Products	Food Processing & Preservation
28	Microbial Analysis And Food Safety	Food Processing & Preservation
29	Oil Seeds Processing And By-Products Utilization	Food Processing & Preservation
30	Operation And Management Of Cold Storage	Food Processing & Preservation
31	Processing And Value Addition Of Plantation Crops	Food Processing & Preservation
32	Pulse Processing And Value Addition	Food Processing & Preservation
33	Ready To Eat (RTE), Ready To Cook(RTC) And Ready To Serve (RTS) Food Products	Food Processing & Preservation
34	Rice Milling	Food Processing & Preservation
35	Food Sensory Assessment Techniques	Food Processing & Preservation
36	Wheat Milling	Food Processing & Preservation
37	Beauty Therapy And Hair Styling Level-1	Beauty Culture & HairDressing
38	Beauty Therapy And Hair Styling Level-2	Beauty Culture & HairDressing

39	Integrated Course In Hair, Skin And Make-Up	Beauty Culture & Hair Dressing
40	Nail Technology	Beauty Culture & Hair Dressing
41	Bridal Make-Up Artist	Beauty Culture & Hair Dressing
42	Beauty Advisor	Beauty Culture & Hair Dressing
43	Ornamentalist–Hand Work Specialist Applique	Garment Making
44	Hand Embroidery	Garment Making
45	Traditional Embroidery	Garment Making
46	Bicycle And Tricycle Repair	Automotive Repair
47	Repair And Overhauling Of 2 Wheeler & 3 Wheeler	Automotive Repair
48	Repair And Overhauling Of Chassis System (Lmv & Hmv)	Automotive Repair
49	Repair And Overhauling Of Engine System (Petrol& Diesel)	Automotive Repair
50	Repair Of Auto-Electrical, Electronics & Air-Conditioning System	Automotive Repair
51	Auto Body Repair, Denting & Painting	Automotive Repair
52	Basic Car Servicing	Automotive Repair
53	Automotive Service And Repair Advance Level1	Automotive Repair
54	Automotive Service And Repair Advance Level2	Automotive Repair
55	Automotive Service And Repair Advance Level3	Automotive Repair
56	Bead Work For Garment	Garment Making
57	Ornamentalist–HandWork Specialist Patch Work	Garment Making
58	Zardozi Work	Garment Making
59	Operator Conventional Milling (Production & Manufacturing)	Production & Manufacturing
60	Operator Cnc Milling(Production & Manufacturing)	Production & Manufacturing
61	Draw Frame Tenter And Cleaner (Spg701)	Textile–Cotton Spinning
62	Sliver Lap And Ribbon Lap Tenter(Spg702)	Textile–Cotton Spinning
63	Ring Frame Machine Operator (Spg704)	Textile–Cotton Spinning
64	Open-End Machine Tenter (Spg705)	Textile–Cotton Spinning
65	Open-End MachineTenter(Spg705)	Textile–Cotton Spinning
66	Card Tenter –High Speed /Super High Speed Cards (Spg706)	Textile–Cotton Spinning
67	Speed Frame Machine Operator (Spg707)	Textile–Winding
68	Winder–Automatic Winding Machine (Wdg701)	Textile–Winding
69	Yarn Packer–Carton Packing (Wdg702)	Textile–Winding
70	Fitter–Manual Winding Machine (Wdg703)	Textile–Winding
71	Fitter–Automatic Winding Machine (Wdg704)	Textiles–Weaving Preparation
72	Warper–Sectional Warping (Wpn705)	Textiles–Weaving Preparation
73	Warper–BeamWarping–Super High Speed(Wpn706)	Textiles–Weaving Preparation
74	Front Attendant–Multi- Cylinder Sizing(Wpn707)	Textiles–Weaving
75	Weaver-Plain Power Loom (Wvg709)	Textiles–Weaving
76	Weaver-Auto Loom (Wvg710)	Textiles–Weaving
77	Weaver–Shuttleless Rapier Looms (Wvg712)	Textiles–Weaving
78	Weaver – Shuttle-Less Gripper / Projectile Looms (Wvg713)	Textiles–Weaving
79	Weaver–Shuttle-Less Air Jet Looms (Wvg714)	Textiles–Weaving
80	Weaver–Shuttleless Water Jet Looms (Wvg715)	Textiles–Weaving
81	Loom Fitter (Wvg716)	Textiles–Weaving
82	Weaver-Dobby Loom (Wvg711)	Textiles–Chemical Processing
83	Effluent Water Treatment Plant Operator (Tcp701)	Textiles–Chemical Processing
84	Hot Air Dryer Operator (Tcp702)	BFSI
85	Weaver–ShuttlelessWater JetLooms(Wvg715)	BFSI
86	Loom Fitter (Wvg716)	BFSI
87	Weaver-Dobby Loom (Wvg711)	BFSI

Rayat Shikshan Sanstha's
Sadguru Gadage Maharaj College, Karad
Department of Computer Science
B.Sc.: 2022-23
Programme Outcome (POs)

Introduction:

B.Sc. Computer Science (Entire) 3 year's program / degree is a specialized program in Computer Science. It enhances the student studies in applied use of computers and to become competent in the current race and development of new computational era.

The duration of the study is of six semesters, which is completed in three years. The program is based on Choice-Based Credit System comprising **160 (Sem-I and Sem-VI) credit points.**

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. India is known to be a leader in software sector.

Computer science graduates find job opportunities in a variety of environments in different software development companies, academia, research, industry, government, private, business organizations, banking sector and so on.

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

The software and IT companies are the major employers of Computer Science graduates.

General Objectives of the Course

- The content of the syllabus have been framed as per UGC norms of CBCS Pattern.
- The students are expected to understand the fundamentals, principles of computer, electronics, mathematics, statistics and IT concepts and recent developments in these subject areas.
- The practical course is in relevance to the theory courses to improve the understanding of the concepts.
- It is expected to inspire the interest of the students towards Computer science.
- To develop the power of appreciations, achievements, and role of Computers in society.
- To enhance student sense of enthusiasm towards IT and to involve them in an intellectually stimulating experience of learning in a supportive environment.
- **B.Sc. Computer Science (Entire)** offers the pre-qualification for professionals heading for smart career in the IT field, which measures up to international standards.
- On completing this course one can do higher studies such as MSc, MCA, MBA etc., in any UGC recognized universities or in any other reputed institution in India or abroad.

1. Eligibility:

Candidate should have passed standard XII (10+2) in Science Stream or government approved equivalent diploma in Engineering/ Technology from any recognized Technical Board.

A candidate who has completed qualifying qualification from any Foreign Board /University must obtain an equivalence certificate from Association of Indian Universities (AIU).

2. PEO, PO and CO Mappings:

Program Educational Outcomes: After completion of this program, the graduates /students would:

PEO-I	Technical Expertise	Implement fundamental knowledge of core and programming computer subjects like C programming, operating system etc. For developing effective technical and computing solutions by incorporating creativity and logical reasoning.
PEO-II	Successful Career	Deliver professional services and knowledge with updated new technologies like, Python, HTML, and PHP etc. in Computer science career.
PEO-III	Interdisciplinary and Life Long Learning	Develop Statistical, Mathematical and Electronical Computation abilities. It also develops analytical, reasoning and logical abilities of students. Undergo higher studies, certifications and technology research as per market needs.

Program Outcomes (PO's)

PO1: Apply knowledge of ICT in solving business problems.

PO2: Learn various programming languages and custom software.

PO3: Design component, or processes to meet the needs within realistic constraints.

PO4: Identify, formulate, and solve problems using computational temperaments.

PO5: Comprehend professional and ethical responsibility in computing profession.

PO6: Express effective communication skills.

PO7: Recognize the need for interdisciplinary, and an ability to engage in life-long learning.

PO8: Knowledge of contemporary issues and emerging developments in computing profession.

PO9: Utilize the techniques, skills and modern tools, for actual development process.

Course Outcome(s): Every individual course under this program has course outcomes (CO). The course outcomes rationally match with program educational objectives. The mapping of PEO, PO and CO is:

Program Educational Objectives	Thrust Area	Program Outcome	Course Outcome
PEO-I	Technical Expertise	PO1,PO2,PO3,PO9	All Core and Programming computer Subjects.
PEO-II	Successful Career	PO4,PO5,PO6	All Electives.
PEO-III	Interdisciplinary and Life Long Learning	PO7,PO8	All Electives, Statistics Mathematics and Electronics Subjects.

3. Workload (Period/Lectures for each Course): For every semester 36 periods (48 minutes per period) are allotted to complete the syllabus of each Course (Subject).

4. Standard of Passing

- I. A candidate must obtain minimum 40% of the marks in each University, internal examination paper, lab course as well as major project.
- II. There shall be a separate head of passing in Theory, Internal, Lab Course and Project examination. However, ATKT rules shall be made applicable in respect of theory and lab courses (University Examination) only.
- III. A candidate should pass Sem-I and Sem-II or obtained ATKT in order to have admission for Second Year.
- IV. A candidate should pass Sem-III and Sem-IV or obtained ATKT in order to have admission for Third Year. However, he/she should pass all subjects of First Year.
- V. For environmental studies Semester IV the candidate shall have to score 40 % out the marks in theory paper and project work.

VI.D.E.G.G (Democracy, Elections and Good Governance) subject code SEC CSE-I and Constitution of India and Local Self Government subject code SEC CSE-II are noncredit course as per notification of university for Semester-I and Semester - II.

Nature of question paper and evaluation scheme:

QUESTION PAPER PATTERN FOR ALL SEMESTERS

Theory Examination (SEE)

Duration: 2 Hours

Total Marks –40

Instructions:

- 1) All questions are compulsory.
- 2) Figures to the right indicate marks.

Que.1) MCQs (1 marks each) =08Marks

Que.2) Long Answer questions (Attempt any 2 out of 3, each carry 8 marks) =16Marks

Que.3) Short Answer questions (Attempt any 4 out of 6, each carry 4 marks) =16Marks

CCE Examination Marks Distribution:

10 Marks for Assignments

Practical Examination

Duration: 4 Hour

Total Marks 80+20=100

Instructions:

- 1) Que.1 is Compulsory
- 2) Attempt Any TWO questions of from Que.2 to Que.4.
- 3) 10 Marks are reserved for Journal.
- 4) Figures to the right indicate marks.

Que.1. Compulsory =30 Marks

Que.2. Optional =20Marks

Que.3. Optional =20 Marks

Que.4. Optional =20Marks

Internal Marks Distribution: 20 Marks

10 Marks for Study/Educational Tour/Seminar +10 Marks for Performance.

Practical Examination conducted by the examiner panel of two members. The panel members should have more than five years' experience as full time teacher.

Department of Computer Science
Nature of SEE Question Papers
(w.e.f.June2022)

Que. 1. Select correct alternative.

08

1.

- | | |
|----|----|
| a) | b) |
| c) | d) |

2.

- | | |
|----|----|
| a) | b) |
| c) | d) |

3.

- | | |
|----|----|
| a) | a) |
| c) | c) |

4.

- | | |
|----|----|
| a) | a) |
| c) | c) |

5.

- | | |
|----|----|
| a) | a) |
| c) | c) |

6.

- | | |
|----|----|
| a) | b) |
| c) | d) |

7.

- | | |
|----|----|
| a) | b) |
| c) | d) |

8.

- | | |
|----|----|
| a) | b) |
| c) | d) |

Que. 2. Attempt any two.

16

- A)
- B)
- C)

Que. 3. Attempt any four.

16

- a)
 - b)
 - c)
 - d)
 - e)
 - f)
-

Department of Computer Science

For academic year: 2022-23

List of Paper Setters

SEM-I

Sr. No.	Name of Paper	Name of Paper setter	College
1	Fundamentals of Computer	Ms. Nalawade D.S.	S.G.M. College, Karad
2	Programming in C Part-I	Ms. Pawar S. S.	
3	Discrete Mathematical Structure	Ms. Pol P.U.	
4	Computational Algebra	Mr. Yadav V.D.	
5	Descriptive Statistics-I	Ms. Lade A. L.	
6	Probability Theory and Discrete Probability Distributions	Ms. Lade A. L.	
7	Electronic Devices and Circuits-I	Mr. Pawar M.S.	
8	Digital Electronics-I	Mr. Pawar M.S.	
9	English for Communication-I	Ms. Mirukhe A.L.	

SEM-II

Sr. No.	Name of Paper	Name of Paper setter	College
1	Linux Operating System	Ms. Nalawade D.S.	S.G.M. College, Karad
2	Programming in C Part-II	Ms. Pawar S. S.	
3	Graph Theory and Algorithms	Ms. Pol P.U.	
4	Computational Calculus	Mr. Yadav V.D.	
5	Descriptive Statistics-II	Ms. Lade A. L.	
6	Continuous Probability Distributions and Testing of Hypothesis	Ms. Lade A. L.	
7	Electronic Devices and Circuits-II	Mr. Pawar M.S.	
8	Digital Electronics-II	Mr. Pawar M.S.	
9	English for Communication-II	Ms. Mirukhe A.L.	

Department of Computer Science

For academic year: 2022-23

List of Examiners

Sr. No.	Name of Subject	Name of Examiners	College
1.	Computer Science	Mr.A.B.Patil.	S.G.M. College,Karad
		Ms.J.S.Jadhav.	
		Ms.S.R.Sawant.	
		Ms.N.S.Thorat.	
		Mr.P.J. Chougule.	
		Mr.N.V.Gaikwad.	
2.	Mathematics	Ms.P.U.Pol.	
		Mr.V.D.Yadav.	
3.	Statistics	Ms.A.A.Lade.	
4.	Electronics	Mr.M.S.Pawar.	

List of Moderators

Sr. No.	Name of Subject	Name of Moderators	College
1.	Computer Science	Mr.Dr.R.J.Jadhav.	Yashwantrao Mohite Institute of Management, Karad
		Mr.Dr.P.P.Patil.	
		Ms.R.U.Attar.	YCIS,Satara
		Mr.R.P.Waghamare	
2.	Mathematics	Mr.S.S. Nalavade.	YCIS,Satara
		Ms. B. R. Tambe.	
3.	Statistics	Ms.P. A. Sande.	YCIS,Satara
		Mr.Ghorpade K. A.	
4.	Electronics	Mr.N.M.Patil.	Balawant College, Vita
		Mr.D.C.Devkote.	
		Mr.A.A.Mulla.	

B. Sc. Computer Science (Entire) Part-I SEM-I

Course Code: DSC-101

Subject Code: BCSE22-101

Paper No. : Computer Science Paper-I

Subject Name: Fundamentals of Computer-I

Total Contact Hours: 36 hrs. (45 lectures of 48 min)

Credits: 02

Teaching Scheme: Theory-03 Lect./Week

Total Marks: 40+10=50

Learning Objectives:-

- i) To learn fundamental concepts of computers, inputs and outputs
- ii) To learn the concept of Operating System.
- iii) To learn the principle of Office Automation.
- iv) To learn the problem solving using Computers.

Unit-I Introduction to Computer System (18 Hrs)

Introduction, Definition, Characteristics and Block diagram of Computer. Limitation and advantages of computer, Types of computers: Mini Computer, Micro Computer, Mainframe and Super Computers, Laptop and Tablet, Computer Languages: Machine Language, Assembly Language, High Level Languages, Translators- Assembler, Compiler and Interpreter, Primary and secondary storage devices, Primary Storage Devices: RAM ROM, PROM and EPROM, Secondary Storage Devices: CD, DVD, Portable Hard Disc & Pen Drive.

Unit-II Computer Hardware and Software (18 Hrs)

Introduction of Hardware, Input Devices: Keyboard, Scanner, OCR, MICR, Output Devices: Printer and its types, Plotter, Monitor- LCD, LED and OLED Displays, Pointing Devices: Mouse, Joystick, Touch Screen, Types and working of Hardware Parts – Motherboard, Ports, HDD, CPU & SMPS, Types of buses-Address bus, Data bus, Definition of Software, Types of Software: System Software and Application Software, Computer Codes-BCD, EBCDIC, ASCII, Gray Code, Excess3-code, Basic Input and Output Settings (BIOS), Network Interface Card (NIC), Graphic Card. Network protocols- HTTP, FTP, TCP/IP.

Learning Outcomes:-

- i) Understand the basic concepts of computer hardware and software
- ii) Understand the basic concepts of Input and output devices of computer system
- iii) Understand the basic concepts of Operating System and its types
- iv) Understand the basic concepts of Problem solving methods using Computer

Reference Books

1. Computer Today–Basandara
2. Fundamentals of Computers --V. Rajaraman.
3. Computer Fundamentals – By P. K. Sinha

Course Code: DSC-102
Subject Code: BCSE22-102
Paper No. : Computer Science Paper-II
Subject Name: Programming in C Part-II

Total Contact Hours: 36 hrs. (45 lectures of 48 min)
Credits: 02 Teaching Scheme: Theory–03 Lect./Week Total Marks: 40+10=50

Learning 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 Planning the Computer Program (18 Hrs.)

Concept of Problem solving, Problem definition, problem analysis, algorithms and flowchart, Debugging, Types of errors in programming, Documentation, Basics of Linux Operating System (Ubuntu) and 'C' programming language, Introduction to GCC Compiler, Data Types, Variable Declaration, Input/output Statement, Built-In Standard Library, Nitty-Gritty of Program, C Program Structure, Vim Editor, Whittling the First 'c' Program, Compilation and Execution Program, Format Specifiers, Escape Sequences, **Branching Statements** - Introduction, if statement, if-else statement, Nested If-else, Switch case statement.

Unit:II Looping Statements and Array (18 Hrs)

Definition of Loop, Types of looping statement-(for, while, do—while), Difference between while loop and do—while Loop, Loop control Statement (break, continue), Infinite Loop, Definition and declaration of array, Features of Array, Initialization of array, Memory representation of array, Types of Arrays, Single Dimensional Array, Two Dimensional Array, String Functions-Predefined

Learning Outcomes:-

1. Illustrate the flowchart and design an algorithm for a given problem and to develop IC programs using operators
2. Develop conditional and unconditional statements to write C program.
3. Exercise user defined functions to solve real time problems.
4. Understand different concepts of Arrays.

Reference Books

1. The C Programming Language - By Brian W Kernighan and Dennis Ritchie
2. C programming in an open source paradigm:- By R. K. Kamat, K . S. Oza, S.R. Patil
3. The GNU C Programming Tutorial -By Mark Burgess
4. Let us C- By Yashwant Kanetkar

Course Code: GEC-103
Subject Code: BCSE22-103
Paper No. : Electronics Paper-I
Subject Name: Electronic Devices and Circuits-I

Total Contact Hours: 36 hrs. (45 lectures of 48 min)
Credits: 02 Teaching Scheme: Theory–03 Lect. /Week Total Marks:40+10=50

Learning objectives:-

- i.** It presents 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 and simulation experiment.

Unit-I Liner components in computer - Resistors: (18 Hrs.)

Classification, construction of carbon composition resistor only, color code method, specifications of resistors, **Capacitors:** Classification, construction of electrolyte capacitor only, finding value of capacitor using number, specifications of capacitors, **Inductors:** types of inductors, its applications, **Transformers:** Types of transformers, (voltage, current) step up, step down transformer and its specifications, Types of switches, Construction and working of electromechanical relay, Types of cables (Coaxial, twisted pair, optical fiber), comparison of cables, **DC circuit analysis** – Concept of ideal & practical voltage and current source, internal resistance etc., Ohm's law, Kirchhoff's current and voltage law, voltage-current divider rules, Application of Kirchhoff's laws to simple circuits, Thevenin's Theorem, Norton's Theorem, Super position Theorem, Maximum power transfer theorem, (only statement and examples)

Unit-II A) Semiconductor Diode (18 Hrs.)

P-N junction diode :Formation of Depletion Layer, Forward and reverse bias characteristics, Zener diode & its parameters, Photodiode- LED (construction & working), Varactor diode, solar cell, Qualitative idea of Schottky diode, Applications- Opto-coupler, dot matrix display of LED, 7 segment display

B) Bipolar Junction Transistors - Symbol, types, construction, Structure and working, CB,CC, CE configurations & comparison, CE mode Input- Output characteristics, Relation between α and β , DC load line & Q point, Factors affecting the Q stability & potential divider biasing, Concept of transistor as an amplifier and transistor as a switch, Application – Amplifier, switch, photo- switch circuit (using photo-diode, transistor, relay)

Learning outcomes:-

Unit 1:

- i) Understand the basic discrete Components in Computer.
- ii) Understand the different types of resistors and its construction.
- iii) Understand the different types of Capacitors and its construction.
- iv) Understand the different types of Inductors and its construction.
- v) Explain the concept of types of transformers and its construction.
- vi) Understand the basic concepts of AC and DC Sources & Electronic Components.
- vii) Concept of circuit analysis for power supply.

Unit 2:

- i) Study of Semiconductor materials
- ii) Study of Semiconductor devices-Diodes, Transistors, FET, MOSFET etc.

Reference Books

- 1) Principles of Electronics: A.P.MALVINO, Tata Mc-Graw Hill Publication, 7 Edition.
- 2) A text Book of Applied Electronics R.S.Sheda ,Sch and Publication
- 3) Electronic Device sand circuits by S.Rama Reddy, Narosa publication Dheil
- 4) Principles of Electronics: V.K.Mehets, S.Chand & Company Ltd.
- 5) Basic Electronics and Linear Circuits:N.N.Bhargava, D.C. Kulshreshtha, S.C.Gupta TMH
- 6) Electronic Devices and ciruits: Boyistead, Tata Mc-Graw Hill
- 7) Operational Amlifiers By Ramakant G

Course Code: GEC-104
Subject Code: BCSE22-104
Paper No. : Electronics Paper-II
Subject Name: Digital Electronics-I

Total Contact Hours: 36 hrs. (45 lectures of 48 min)

Credits: 02

Teaching Scheme: Theory–03 Lect./Week

Total Marks:40+10=50

Learning objectives:-

- i. To understand the basic digital devices.
- ii. The designing of digital systems.

Unit-I A) Number Systems & Binary Codes (18 Hrs.)

Introduction to Decimal, Binary, Hexadecimal Number system, Inter conversion from one system to Another (examples), BCD code, Gray code, Excess-3 code, ASCII code, EBCDIC code, Concept of parity bit, Signed and unsigned numbers representation, 1's & 2's complement of binary numbers, 9's complement and binary arithmetic, Hamming code for error correction & detection

B) Logic Gates - AND, OR, NOT, NOR, NAND, EX-OR (Symbol, Expression and Truth Table), Application of EX-OR gate, Boolean algebra and identities, De Morgan's theorem and Inter conversion of logic Gates (NAND and NOR), Simplifications of logic expressions using - a) Boolean algebra b) Kmap, (using SOP format upto 4 variables) with examples, Introduction to logic families (TTL, ECL, CMOS), TTL NAND gate & CMOS NOT gate, Input output parameters – Logic levels, switching speed, propagation delay, power dissipation, noise margins and fan in-out of TTL and CMOS, Tristate logic (inverter & buffer)

Unit-II A) Combinational Circuits (18 Hrs.)

- Introduction, Half adder, Full adder, Half & Full Subtractor, Parallel adder, Universal Adder & Subtractor, Encoder (decimal-BCD), priority encoder, Decoder (BCD-Decimal), 3x4 matrix keyboard encoder, Multiplexer and De-multiplexer (upto 8:1 & 1:8), Study of IC 74153, 74151, 7447, 74138, 74139, 74148 etc. (only up to features) for practical's only

B) Sequential Circuits - Concept of sequential circuits, Flip-flops : RS, Clocked RS, Latch, D(edge triggered), JK, Master-Slave JK in detail (including advantages, drawbacks & applications) PRESET & CLEAR in Flip-flop, Counter-synchronous, asynchronous (up to 4-bit), up-down counter (3-bit, Modulus-N counter, applications of counter, Construction of mod-5, mod-10 counter, Shift Register: SISO,SIPO,PISO,PIPO, Ring counter, Johnson counter, (4-bits) Study of IC 7495,7490 (up to features) for practical's only.

Learning outcomes:-**Unit 1:**

- i. Understanding of number systems and binary codes.
- ii. Study of basic digital devices.
- i. Design of different digital system.

Unit 2:

- i. Study of different sequential circuits.
- ii. Study of Basic memory elements and digital storage devices.

Reference Books:

1. Digital principals and applications; Malvino Leach, Tata Mc Graw Hill ,4th Edition
2. Fundamentals of Digital Electronics: A.Anand KumarPHIPublication2001
3. Digitalprincipals:T.L.Floyd3rdedition
4. Digital Electronics: C.F.Strangio
5. Modern digital Electronics: R.P.Jain, Tata McGraw Hill Publication
6. Digital logic and computer design–Morris Mano
7. First course in Digital System Design: John P.Uyemura, Brooke/Cole Thompson Learning (2001)

Course Code: GEC-105
Subject Code: BCSE22-105
Paper No. : Mathematics Paper-I
Subject Name: Discrete Mathematics

Total Contact Hours: 36 hrs. (45 lectures of 48 min)
Credits: 02 Teaching Scheme : Theory–03 Lect./Week Total Marks: 40+10=50

Learning Objectives:-

- i) To learn fundamental concepts Counting Principal and Recurrence relation.
- ii) To learn the principle of Recurrence relation.
- iii) To learn the concepts of Logic
- iv) Learn above concepts with Examples.

Learning Outcomes:

Unit-I Counting Principles (12 Hrs)

Functions: Definition, Types of mapping, Injective, Surjective & Bijective functions, Inverse function, Composition of functions, 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-II Recurrence Relations (12 Hrs)

Introduction, Linear Recurrence relation with constant coefficient, Homogeneous solutions and Examples, Particular and Total Solution, Examples

Unit-III Logic (12 Hrs)

Propositions and Logical connectives: Definition, Types of Propositions, Truth values and Truth Tables, Tautology and Contradiction, Logical equivalence, Rules of inferences, Valid arguments and proofs, Methods of Proofs : Direct and indirect Examples.

Unit 1:

- i) Demonstrate mathematical skills, analytical and critical thinking abilities.
- ii) Demonstrate comprehension of discrete structures and their relevance within the context of computer science, in the areas of data structures and algorithms.
- iii) Apply discrete structures into other computing problems such as formal specification, verification, databases, artificial intelligence, and cryptography.

Unit 2:

- i) Students will learn: some fundamental mathematical concepts and terminology; how to use and analyses recursive definitions,
- ii) Student should know how to count some different types of discrete structures, techniques for constructing mathematical proofs mathematical concepts and principles to perform computations

Unit 3:

- i) Apply formal logic proofs or informal, logical reasoning to real problems, such as predicting the behavior of software or solving problems such as puzzles.
- ii) Communicate clearly and effectively using the technical language of the field correctly.
- iii) Develop a critical appreciation of the use of information and communication technology in mathematics

Reference Books

- 1 Elements of Discrete Mathematics by C. L. Liu
- 2 Discrete Mathematics by Olympia Nicodemi
- 3 Discrete Mathematical Structure for Computer Science by Alan Doerand K. Levasicur.
- 4 Discrete and Combinatorial Mathematics by R. M. Grassl
- 5 Discrete Mathematics by Kenneth Rosen, Tata McGrawHill
- 6 Discrete mathematics by S. R. Patil and others, NIRALI Prakashan.
- 7 Discrete mathematics by Bhopatkar, Nimbkar, Joglekar, **VISION** Publication.
- 8 Discrete mathematics by Naik and Patil, PHADAKE Prakashan

Course Code: GEC-106
Subject Code: BCSE22-106
Paper No. : Mathematics Paper-II
Subject Name: Algebra

Total Contact Hours: 36 hrs (45 lectures of 48 min)

Credits: 02

Teaching Scheme: Theory–03 Lect./Week

Total Marks: 40+10=50

Learning Objectives:-

- i. To learn fundamental concepts Relation and function with an Examples.
- ii. To learn the concepts Divisibility of integers
- iii. To learn the principle of Congruence Equation.
- iv. To learn the concepts of Logic and Boolean Algebra

Unit-I Relations (12 Hrs)

Ordered pairs, Cartesian product, Relations, Types of relations, Equivalence relation, Partial ordering, relation, Examples, Digraphs of relations, matrix representation and composition of Relations, Examples, Transitive closure, Warshall's algorithm, Examples, Equivalence class, Partition of a set

Unit-II Divisibility of integers (12 Hrs) Introduction, Divisibility : Division algorithm (Statement only), Greatest Common Divisor (GCD), Least Common Multiple(LCM), Euclidean algorithm (Statement only), Prime numbers, Euclides Lemma, Fundamental theorem of Arithmetic (without proof), Congruence relation and its properties, Fermat's Theorem (Statement only).Examples, Residue Classes: Definition, Examples, addition modulon, multiplication modulon.

Unit-III Boolean algebra (12 Hrs) Hasse digram, 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

Learning Outcomes :

Unit 1:

- i. Students will develop and apply concepts of expressions, equations and inequalities to investigate and describe relationships and solve problems.
- ii. Students will understand the basic algebraic functions in terms of fundamental concepts such as rate of change, input or output variables, domain & range, and parameters, and use multiple representations of functions.

Unit2:

- i. Add, subtract, multiply and divide fractions and real numbers.
- ii. Analyze and demonstrate examples of divisibility of real number.

Unit3:

- i. Define and evaluate polynomials.
- ii. Write and interpret mathematical notation and mathematical definitions.

Reference Books

1. Algebra by S. R. Patil and Others Nirali Prakashan.
2. Algebra by Bhopatkar, Nimbkar, Joglekar, VISION Publication.
3. Algebra by Naik and Patil, PHADAKE Prakashan

Course Code: GEC-107
Subject Code: BCSE22-107
Paper No. : Statistics Paper– I
Subject Name: Descriptive Statistics–I

Total Contact Hours: 36 hrs. (45 lectures of 48 min)
Credits: 02 Teaching Scheme: Theory–03 Lect./Week Total Marks:40+10=50

Learning 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 Moments with an examples

Unit-I Nature of data and Measures of Central Tendency (18 Hrs.)

Definition, Introduction, importance, scope and limitations of Statistics, Population and Sample: Concept of statistical population with illustrations, concept of sample with illustrations. Methods of sampling: Simple Random Sampling and Stratified Random Sampling (description only), 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, uses of Histogram and Ogive curves, Examples and Problems, 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, computation for ungrouped and grouped data, graphical method, merits and demerits, **Mode**: Definition, computation for ungrouped and grouped data, graphical method, merits and demerits, **Quartiles**: Definition, computation for ungrouped and grouped data graphical method, Illustrative Examples.

Unit-II Measures of Dispersion and Moments (18 Hrs)

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, combine S.D. and variance for two groups, merits and demerits, Illustrative Examples, **Raw and central moments**: Definition for ungrouped and grouped data (only first four moments), relation between central and raw moments (statements only), Measures of **skewness**: Types of skewness, Pearson's and Bowley's coefficients of skewness, Measures of skewness based on moments, **Measures of kurtosis**: Types of kurtosis, Measures of kurtosis based on moments. Illustrative Examples.

Learning Outcomes:

Unit1:

- i) To construct the data.
- ii) To classify and tabulate the data.
- iii) To demonstrate classified and tabulated data.
- iv) To draw and interpreted various graphs and diagrams.
- v) To define mean, median, mode etc.
- vi) To compute and interpret measures of central tendency.

Unit2:

- i) To define S.D., variance etc.
- ii) To compute and interpret measures of dispersion.
- iii) To analyses and interpreted the data.
- iv) To define moment, Skewness etc.
- v) To compute and interpret skewness and kurtosis.
- vi) To demonstrate the shape, size and height of data.

Reference Books:-

1. Fundamentals of Statistics by Goon, Gupta, Das Gupta.(Unit-1,2,3,4)
2. Fundamental of Statistics by S. C. Gupta.(Unit-1,2,3,4)
3. Complete Business Statistics by Amir D. Aczel, JayalSounderpandian.(Unit-1,2,3,4)
4. Fundamental of Statistics by D. N. Elhance, B. M. Agarwal.(Unit-1,2,3,4)
5. Basic Statistics by B. L. Agarwal.(Unit-1,2,3,4)
6. Statistical Methods by S. P. Gupta.(Unit-1,2,3,4)
7. Fundamental of Mathematical Statistics by Gupta and Kapoor.(Unit-1,2,3,4)

Course Code: GEC-108
Subject Code: BCSE22-108
Paper No. : Statistics Paper– II

Subject Name: Probability Theory and Discrete Probability Distributions

Total Contact Hours: 36 hrs. (45 lectures of 48 min)

Credits: 02

Teaching Scheme: Theory–03 Lect./Week

Total Marks:40+10=50

Learning Objectives:-

- i. To learn fundamental concepts Probability with an examples.
- ii. To learn the Theorems on probability
- iii. To learn the types of probability.
- iv. To learn the concepts of standard discrete probability distributions

Unit-I Probability (18 Hrs.)

Idea of permutation and combination, concept of random experiments, Definitions: sample space (finite and countably infinite), equiprobable sample space, events, types of events, power set (sample space consisting at most 3 sample points), examples, Classical (apriori) definition of probability of an event, simple examples of probability of an events based on permutations and combinations, axiomatic, definition of probability with reference to finite and countably infinite sample space, examples.

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 $A \subseteq B$ then $P(A) \leq P(B)$,
- v) $0 \leq P(A \cap B) \leq P(A) \leq P(A \cup B) \leq P(A) + P(B)$

Definition of conditional probability of an event, examples., Partition of sample space, Baye's theorem (only statement) 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.

Pair wise and complete independence of three events.

Illustrative Examples.

Unit-II Discrete probability distributions (18 Hrs.)

Definitions: discrete random variable, probability mass function (p. m. f.), cumulative distribution function (c. d. f.), properties of c. d. f., median, mode and examples,

Definition of expectation (mean) and variance of a random variable, expectation and variance of a function of random variable, Results on expectation:

$E(c) = c$, where c is constant, $E(aX + b) = a E(X) + b$, where a and b are the constants.

Theorems on Variance: i) $V(c) = 0$, where c is constant.

ii) $V(aX + b) = a^2 V(X)$, where a and b are the constants.

Discrete uniform distribution: p. m. f., mean and variance,

Examples, Binomial distribution: p. m. f., mean and 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, examples.

Learning Outcomes:

Unit1:

- i) To classify and tabulate the data.
- ii) To define sample space, event, probability etc.
- iii) To compute probabilities by using definition and probability rules.
- iv) To classify and tabulate the data.
- v) To define probability, conditional probability, independent event etc.
- vi) To compute conditional probabilities by using definition and probability rules.

Unit2:

- i) To define random variable, p.m.f., distribution function etc.
- ii) To explain mean, median, mode.
- iii) To compute mean, mode, median etc.
- iv) To compute and interpret statistical distributions.
- v) To draw and interpret the shape of discrete probability distributions.
- vi) To explain various discrete distributions.
- vii) To compute probabilities by using discrete probability distributions.
- viii) To draw and analyse model sample for various distributions.

Reference Books:-

1. Modern Mathematical Statistics by Edward J. Dudewicz, Satya N. Mishra.(Unit-1,2,3)
2. Fundamentals of Statistics by S. C. Gupta.(Unit-1,2,3,4)
3. Complete Business Statistics by Amir D. Aczel, Jayal Sounder pandian.(Unit-1,2,3,4)
4. Fundamental of Statistics by D. N. Elhance, B. M. Agarwal.(Unit-1,2,4)
5. Basic Statistics by B. L. Agarwal.(Unit-1,2,3,4)
6. Statistical Methods by S. P. Gupta.(Unit-1,2,3,4)
7. Fundamental of mathematical statistics by Gupta and Kapoor.(Unit-1,2,3,4)
8. Mathematical Statistics by J.E. Freund.(Unit-1,2,3)

Course Code: AECC-A
Subject Code: BCSE22-109

Paper No. : English paper-I

Subject Name: English for Communication-I

Total Contact Hours: 36 hrs. (45 lectures of 48 min)

Credits: 02

Teaching Scheme: Theory–04 Lect./Week

Total Marks:40+10=50

Course Objectives:

1. To acquaint students with communication skills.
2. To inculcate human values among the students through poems and prose.
3. To improve the language and business competence of the students.

Module I

- A) Developing Vocabulary
- B) Technology with a Human Face – E. F. Schumacher
- C) How Beautiful - P. K.Padhy

Module II

- A) Narration
- B) As a Flower I Come – by Sundaram

Module III

- A. Description
- B. I Have a Dream - Martin Luther King

Module IV

- A) The Auspicious Vision- Tagore
- B. The Book - Iftikar Rizvi

Division of Teaching hours (Total 60 Periods)

1. Communication Skills: 3 X 12 = 36 periods
2. Reading Comprehension: 6X4 = 24 periods

Do work of Syllabus Cut and Paste Sequencewise only
Sem-II and previous work completed

B. Sc. Computer Science (Entire) Part-I SEM-II

Course Code: DSC-201

Subject Code: BCSE22-201

Paper No. : Computer Science Paper-III

Subject Name: Linux Operating System

Total Contact Hours: 36 hrs. (45 lectures of 48 min)

Credits: 02

Teaching Scheme: Theory–03 Lect./Week

Total Marks: 40+10=50

Learning Objectives:-

- i. To learn fundamental concepts of Network Basic Concepts
- ii. To learn the concepts Operating System.
- iii. To learn the principle of Office Automation.
- iv. To learn the problem solving using Computers.

Unit-I Introduction to Operating System (18 Hrs.)

Definition of Operating System, Need and Functions of Operating System, Operating Systems: basics of Unix, Introduction to Linux, Comparison of Linux with Windows operating system, Architecture of Linux, Login, Logout, Shell, Kernel, GPU Commands (cal, date, who etc), 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, Creating files using VI editor, Handling command mode, insert mode and ex mode.

Unit-II Shell Programming and Internet (18 Hrs.)

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, Introduction to Internet, History of Internet, Internet Protocol (SMTP, POP, IMAP), Introduction to different Web browsers, Concept of Email, component of email, Working with email (Compose e-mail, Sende-mail, File attachment, Uploading & downloading.)

Learning Outcomes:-

- i) Understand the basics concepts of computer networks.
- ii) Study different MSOffice/Open Source Word Tools.
- iii) Study different MSOffice/Open Source Excel Tools.
- iv) Study different MSOffice/Open Source PowerPoint Tools.

References Book-

1. Operating System Concepts – Silberschatz, Galvin and Gagne
2. Operating System By Godbole
3. Linux Bible 9th Edition by Christopher Negus ISBN: 978-1 118-99987-5
4. Ball, Using Linux, PHI, 1998. ISBN-10: 0789716232
5. UNIX: Concepts and Applications Das (4th Ed), TMH, 2006 ISBN 13: 9780070635463

Course Code: DSC-202
Subject Code: BCSE22-202
Paper No. : Computer Science Paper-IV
Subject Name: Programming in C Part-II

Total Contact Hours: 36 hrs. (45 lectures of 48 minutes)

Credits: 02 Teaching Scheme: Theory–03 Lect. /Week Total Marks: 40+10=50

Learning 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 Functions and Pointer (18 Hrs.)

Definition, declaration, prototype of function, Local and global variable, User defined functions, Recursion, Storage classes, Pointer Definition and Declaration, Pointer Initialization, Pointer arithmetic, Arrays of Pointers, Pointers and One and two , dimensional Arrays, Call by value and call by reference, Dynamic Memory Allocation

Unit =II Structures, Union and File Handling (18 Hrs.)

Definition and declaration of structure, Nested Structure, Array of structures, structure pointer, passing structure to function, self-referential structure, size of() and typedef Keyword, Definition and declaration, of union, Difference between Structure and Union, Concept of File, Text and binary mode files, Opening and closing files-fopen() and fclose(), File opening mode- read, write, append ,reading and writing, character and string function (getc(), putc(), getw() ,putw(), gets(), puts()), Formatted input- scanf(), sscanf(), fscanf(), fread(), Formatted output- printf(), sprintf(), fprintf(), fwrite(), Functions- fseek(), ftell(), fflush(), fclose(), rewind().

Learning Outcomes:-

- i. Study different basic concepts pointers in C
- ii. Understand the different concepts of operations on Pointers.
- iii. Describe C programs that use Pointers to access arrays and functions.
- iv. Describe C programs using pointers and to allocate memory using dynamic memory management functions.

Reference Books

1. The C- Programming Language - By Brian W Kernighan and Dennis Ritchie
2. C-Programming in an open source paradigm:– By R. K. Kamat, K. S. Oza, S. R. Patil
3. The GNU C Programming Tutorial -By Mark Burgess
4. Let us C- By Yashwant Kanetkar

Practical

Course Code: DSC P1

BCSE22-210: Lab Course-I : Computer Science

(Based on BCSE22-102, BCSE22-201 and BCSE22-202)

Practical on 'C' Programming (BCSE22-102, BCSE22-202)

1. Write a program to accept t5 subject marks and calculate total marks, percentage and grade of student.
2. Write a program to input a number rand find the given number is Odd or Even.
3. Write a program to input the day number and display day of week.
4. Write a program to find the sum of first n natural numbers.
5. Write a program which display following output-
A B C DE
A B CD
A B C
AB
A
6. Write a program to accept the range and generate Fibonacci Series.
7. Write a program to find given number is Armstrong or not.
8. Write a program to find prime numbers between given range
9. Write a program to sort the numbers in ascending and descending order using array.
10. Write a program to add two Matrices; Use two Dimensional arrays
11. Write a program to find the product of given two matrices.
12. Write a function which adds three number and display output on the screen.
13. Write a function which calculate cube of given number.
14. Write a program which swap two number using
a) call by value and b) call by reference.
15. Write a program which create student structure which accept student roll no, student name, address, subject marks, percentage and display same onscreen.
16. Write a program to separate even and odd numbers available in file.
17. Write a program to count the no. of words in a given text file.
18. Write a program to remove blank lines from a file.

19. Write a program to copy content of one file into another file.
20. Write a file handling program which accept student information store it into disk file using binary mode.

Practical on Linux(BCSE22-201)

1. Starting and Stopping Linux: Booting a Linux System, Shutting Down a Linux System
2. Demonstration of Linux commands with attributes: - pwd, cd, ls, echo, clear, kill, ps, man, cal, date, who, who am I, wc, mkdir, rmdir, rm, sort.
3. Creation of Files, and changing their permission using ch mode command.
4. Write a shell script which check given number is prime or not.
5. Write a shell script to modify “cal” command to display calendars of the specified range of months.
6. Write a shell script which display date in the mm/dd/yy format.
7. Write a shell script which check given number is positive or not.
8. Write a shell script to display the multiplication table of given range,
9. Write a shell script to find the sum of digits of a given number.
10. Write a shell script to find the LCD (least common divisor) of two numbers.
11. Write a shell script to find the factorial of a given number.
12. Study information of Modem, IP address, Hub, and Switch on Internet
13. Study different web Browsers of internet.
14. Create your E-Mail ID and send an E-mail.
15. Login through your E-Mail ID and do the following: Read your mail Compose a new Mail, Send the Mail to one person, Send the same Mail to various persons, Forward the Mail, Delete the Mail ,Send file as attachment

Course Code: GEC-205
Subject Code: BCSE22-205
Paper No. : Mathematics Paper-III
Subject Name: Graph Theory

Total Contact Hours: 36 hrs. (45 lectures of 48 min)

Credits: 02 Teaching Scheme: Theory–03 Lect./Week Total Marks: 40+10=50

Learning Objectives:

- i. To understand the concepts of Graphs and operations on graphs with an examples
- ii. To understand the concepts of Tree graphs and directed graphs with an examples

Unit -I Graphs and operations on graphs (12 Hrs.)

Definition, Types of graphs, Isomorphism, Matrix representation of graphs: Adjacency matrix and incidence matrix, Sub graphs and induced graphs, Complement of a graph, Self complement graphs, Union, intersection of graphs, Ring sum of two graphs.

Unit-II Connected Graphs (12 Hrs.)

Definitions: walk, trail, tour, path and circuit, Definitions of connected, disconnected graphs, Dijkstra's shortest path algorithm, Connectivity: Isthmus, cut-vertex, Edge connectivity & vertex connectivity.

Unit-III Tree Graphs (12 Hrs.)

Tree: Definition, Theorem : A tree with n vertices has $n - 1$ edges, Theorem: A connected graph G with n vertices and $n - 1$ edges is a tree, Theorem: A graph with n vertices is a tree if and only if it is circuit free and has $n - 1$ edges, Theorem: A graph G is a tree if and only if it is minimally connected, Centre of a tree, Spanning tree: Definition and examples, Fundamental circuit and cut - set : Definition, Binary trees and elementary results, Kruskal's algorithm.

Learning Outcomes:

Unit1:

- i. Student able to formulate problems in terms of graphs, solve graph theoretic problems.
- ii. To understand the concepts of Graph and types of graphs

Unit2:

- i. Use mathematical definitions to identify and construct examples and to distinguish examples.
- ii. To understand the concepts of problem solving methods using algorithms of graphs
- iii. Determine whether graphs are Hamiltonian and/or Eulerian

Unit3:

- i. Solve problems using basic graph theory
- ii. To understand the concepts of Binary Tree.

Reference Books

1. Elements of Discrete Mathematics by C. L. Liu
2. Discrete Mathematical Structure for Computer Science by Alan Doer & K. Levasicur.
3. Discrete and Combinatorial Mathematics by R. M. Grassl
4. Discrete Mathematics by Kenneth Rosen, Tata McGraw Hill
5. Graph Theory with Applications to Computer Sc. & Engg .By Narsing Deo, PHI
6. A First Step in Graph Theory by Raghunathan, Nimkar and Solapurkar
7. Discrete mathematics by S. R. Patil and others, NIRALI Prakashan.
8. Discrete mathematics by Bhopatkar, Nimbkar, Joglekar, VISION Publication.
9. Discrete mathematics by Naik and Patil, PHADAKE Prakashan

Course Code: GEC-206
Subject Code: BCSE22-206
Paper No. : Mathematics Paper-IV
Subject Name: Calculus

Total Contact Hours: 36 hrs. (45 lectures of 48 min)
Credits: 02 Teaching Scheme: Theory–03 Lect./Week Total Marks: 40+10=50

Learning Objectives:

- i) To teach the student continuity and Mean value theorem
- ii) To understand the concepts of Successive differentiation
- iii) To understand applications of L'Hospital's Rule

Unit-I Continuity and Mean value Theorems (14 Hrs.)

Continuity of a function and its properties defined on $[a,b]$ (Properties without proof), Differentiability. Differentiability implies continuity but not Conversely, Rolle's theorem (with proof) and its geometric significance and examples, Lagrange's Mean Value theorem (with proof) and its geometric significance and examples, Cauchy's Mean Value theorem (with proof) and examples.

Unit-II Successive Differentiation: (12 Hrs.)

n^{th} derivatives of some standard functions, Examples on n^{th} derivatives and examples, Leibnitz's Theorem (with proof), Examples on Leibnitz's Theorem

Unit-III Indeterminate Forms & Series Expansions (10 Hrs)

Indeterminate forms, L'Hospital's Rule (without proof), Examples on L'Hospital's Rule, Taylor's and Maclaurin's Theorems with Lagrange's and Cauchy's forms of Remainders (without proof), Taylor's and Maclaurin's series, Series expansions of e^x , $\sin x$, $\cos x$, $\log(1 + x)$ etc

Learning Outcomes:

Unit 1: Determine the continuity and differentiability of a function and apply the mean value theorems.

Unit 2: Compute n^{th} derivatives of algebraic, trigonometric, piece-wise defined functions, logarithmic and exponential functions.

Unit 3: Compute the limit of Indeterminate Forms and Series Expansions

Reference Books

- i) Calculus by Dr. S. B. Nimse
- ii) Differential Calculus by Shanti Narayan, S. Chand & Co.
- iii) A text book of Calculus and Differential Equations by Dinde H. T. Lokhande A. D. SUMS Publication.
- iv) Calculus by Dr. B. P. Jadhav and others Phadke Publication

Practical

Course Code: GEC P3

BCSE22-212: Lab Course-III: Mathematics

(Based on BCSE22-105, BCSE22-106, BCSE22-205 and BCSE22-206)

1. Recurrence relation
2. Combinatorial arguments
3. Proofs of valid arguments using truth table
4. Proofs of valid arguments using laws of inferences
5. Examples on equivalence relation
6. Euclid's algorithm, Division algorithm
7. Fermat's theorem on remainder
8. Warshall's algorithm
9. Disjunctive and Conjunctive normal forms of Boolean expression
10. Finite state machine, input tape output tape
11. Kruskal's algorithm
12. Dijkstra's Shortest path algorithm
13. Fundamental circuit and fundamental cut set
14. Union, intersection & Ring sum of two graphs
15. Rolle's Theorem
16. Lagrange's Mean Value Theorem
17. Cauchy's Mean Value Theorem
18. Series expansion of $\log(1+x)$, e^x , $\sin x$, $\cos x$, $(1+x)^n$
19. L'Hospital's Rule
20. Leibnitz's Rule

Course Code: GEC-207
Subject Code: BCSE22-207
Paper No. : Statistics Paper– III
Subject Name: Descriptive Statistics– II

Total Contact Hours: 36 hrs. (45 lectures of 48 min)

Credits: 02

Teaching Scheme: Theory–03 Lect./Week

Total Marks: 40+10=50

Learning Objectives:-

- i. To learn fundamental concepts of Correlation and Regression with an examples.
- ii. To learn the Multiple Regression and Partial Correlation with an examples

Unit-I Correlation and Regression (for ungrouped data) (18 Hrs.)

Concept of bivariate data, scatter diagram, concept of correlation, positive correlation, negative correlation, cause and effect relation, Karl Pearson's coefficient of correlation, properties of correlation coefficient, interpretation of correlation coefficient, Spearman's rank correlation coefficient (formula with and without ties), Concept of regression, Derivation of lines of regression by method of least squares, Regression coefficients and their significance, Properties of regression coefficients, Point of intersection and acute angle between regression lines (without proof), Illustrative Examples.

Unit-II Multiple Regression and Multiple, partial Correlation (For Trivariate Data) (18 Hrs.)

Concept of multiple regressions, Yule's Notations, Fitting of multiple regression planes, Partial regression coefficients, interpretations, Concept of multiple correlation: Definition of multiple correlation coefficient and its formula, Properties of multiple correlation coefficient (statements only), Interpretation of multiple correlation coefficient when it is equal to zero and one, Concept of partial correlation. Definition of partial correlation coefficient and its formula, Properties of partial correlation coefficient (statements only), Examples and problems.

Learning Outcomes:

Unit1:

- i) To compute relation between two variables.
- ii) To define correlation, types of correlation methods of correlation etc.
- iii) To compute and interpret correlation, methods of correlation etc.
- iv) To analyses and interpreted the data.
- v) To compute relation among three variables.
- vi) To define regression, lines of regression etc.
- vii) To fit lines of regression by method of least square
- viii) To analyses and interpreted the data.

Unit2:

- i) To define multiple regression.
- ii) To fit plane of multiple of regression.
- iii) To analyses and interpreted the data.
- iv) To define partial correlation, multiple correlation etc.
- v) To compute and interpret partial and multiple correlation
- vi) To analyses and interpreted the data.

Reference Books:-

1. Fundamentals of Statistics by S. C. Gupta.
2. Complete Business Statistics by Amir D. Aczel, JayalSounderpandian.
3. Fundamental of Statistics by D. N. Elhance, B. M. Agarwal
4. Mathematical Statistics by J.E. Freund.
5. Basic Statistics by B. L. Agarwal
6. Mathematical Statistics by J. N. Kapur, H. C. Saxena.
7. Statistics by D. N. Sancheti, V. K. Kapoor

Course Code: GEC-208
Subject Code: BCSE22-208
Paper No. : Statistics Paper– IV
Subject Name: Continuous Probability Distributions and Testing of Hypothesis

Credits:02 **Total Contact Hours: 36 hrs. (45 lectures of 48 min)**
Teaching Scheme :Theory–03Lect./Week **Total Marks:40+10=50**

Learning Objectives:-

- i. To learn concepts of Continuous Univariate Distributions.
- ii. To learn the Exact sampling distributions with an examples
- iii. To learn the Test of Hypothesis and Simulation with an examples

Unit-I Continuous Univariate Distributions (18 Hrs.)

Definitions: infinite sample space with illustrations, continuous random variable, probability density function (p.d.f.), cumulative distribution function (c.d.f.), properties of c.d.f. **Expectation of random variable**, expectation of function of a random variable, variance and examples. **Uniform distribution:** p.d.f., c.d.f., mean, variance and examples. **Exponential distribution:** p.d.f., c.d.f., mean, variance, lack of memory property and examples. **Normal distribution:** p.d.f., standard normal distribution, properties of normal curve, distribution of $aX+bY$, where X and Y are independent normal variates, examples. **Introduction to simulation**, Model sampling from uniform and exponential distribution, Model sampling from normal distribution using Box-Muller transformation. **Chi-square distribution:** Definition, chi-square variate as the sum of square of i.i.d. S.N.V (statement only), p.d.f., mean, variance, additive property, examples. **Student's t-distribution:** Definition, nature of probability curve, mean and variance, examples. **Snedecor's F-distribution:** definition, mean and variance, inter-relationship between chi-square, t and F distributions, examples.

Unit-II Testing of hypothesis (18 Hrs.)

Definitions: Sample, parameter, statistic, standard error. Simple and composite hypothesis, Null and alternative hypothesis, type I and type II error, critical region, level of significance, one and two tailed tests, general procedure of testing of hypothesis.

- Large sample tests**
- i) Test for population mean $H_0: \mu = \mu_0$,
 - ii) Test for equality of population means $H_0: \mu_1 = \mu_2$,
 - iii) Test for population proportion $H_0: P = P_0$.
 - iv) Test for equality of population proportions $H_0: P_1 = P_2$.

- Chi-square test:**
- i) Test for goodness of fit
 - ii) Test for population variance $H_0: \sigma = \sigma_0$
 - iii) Test for independence of attributes

- t-test:**
- i) Test for population mean $H_0: \mu = \mu_0$,
 - ii) Test for equality of two population means $H_0: \mu_1 = \mu_2 (\sigma_1 = \sigma_2)$,
 - iii) Paired t-test.

- F-test:** i) Test for equality of two population variances $H_0: \sigma_1 = \sigma_2$.

Learning outcomes:

Unit1:

- i) To define continuous random variable ,p.d.f., distribution function etc.
- ii) To draw and interpreted the shape of continuous probability distributions.
- iii) To explain various continuous distributions.
- iv) To compute probabilities by using continuous probability distributions.
- v) To draw and analyses model sample for various distributions.
- vi) To compute and interpret statistical distributions.
- vii) To draw and analyses model sample for various distributions.

Unit2:

- i. To define statistic, parameter, test statistic etc.
- ii. To explain procedure of testing of hypothesis.
- iii. To explain the small sample and large sample tests in various situations
- iv. To draw and analyses model sample for various distributions.
- v. To Simulation study of various distributions.

Reference Books

- 1.Fundamentals of Statistics by Goon, Gupta, DasGupta.
- 2.Statistical Methods by S. P.Gupta.
- 3.Business Statistics by S.Saha.
- 4.Modern Elementary Statistics by J.E.Freund.
- 5.Fundamental of Statistics byS.C.Gupta.
- 6.Fundamentals of Mathematical Statistics by Gupta and Kapoor.
- 7.Statistical Methods (An introductory text by J.Medhi)
- 8.ProbabilityandstatisticswithreliabilityqueuingandcomputerscienceapplicationsbyK.S.Trivedi.
- 9.Fundamental of Mathematical Statistics by Gupta and Kapoor.
- 10.System simulation with digital computers by Narsingh Deo.
- 11.Introduction to Probability theory and Mathematical Statistics by V. K.Rohatgi
- 12.Testing of Statistical Hypothesis by E L.Lehmann.
- 13.100StatisticalTestsbyG.K Kanji

Practical
Course Code: GEC P4
BCSE22-213: Lab Course-IV: Statistics
(Based on BCSE22-107, BCSE22-108, BCSE22-207 and BCSE22-208)

List of Statistics experiments to be performed:

- 1) Construction of frequency distributions and graphical methods.
- 2) Measures of central tendency.
- 3) Measures of dispersion.
- 4) Moments, skewness, kurtosis.
- 5) Correlation coefficient.
- 6) Fitting of lines of regression (Ungrouped data).
- 7) Fitting of regression planes and estimation.
- 8) Multiple Regressions.
- 9) Multiple and partial correlation coefficients.
- 10) Fitting of Binomial and Poisson distributions.
- 11) Model sampling from Binomial and Poisson distributions.
- 12) Fitting of Uniform and Exponential distributions.
- 13) Fitting of Normal distribution.
- 14) Model sampling from Uniform and Exponential distributions.
- 15) Model sampling from Normal distribution using:
 - i) Normal table and ii) Box-Muller transformation.
- 16) Large sample tests for means.
- 17) Large sample tests for proportions.
- 18) Tests based on Chi-square distribution.
- 19) Tests based on t distribution.
- 20) Tests based on F distribution.

Note:

1. Test of goodness of fit is necessary for every practical on fitting of distributions.
2. All practicals are to be done on computers using MS-EXCEL.
3. Calculations (observation table) should be done by using Statistical formulae.
4. Computer printout is to be attached to the journal.
5. Student must complete the entire practical to the satisfaction of the teacher concerned.
6. Student must produce the Laboratory Journal along with the completion certificate signed by the Head of the department, at the time of practical examination.

Laboratory Requirements:

Laboratory should be well equipped with sufficient number of (20) computers along with necessary software, printers, UPS. Statistical tables should be provided to the students during practical as per requirement.

Practical Examination will be conducted as:

- 1) Paper Work: In this session a student is expected to write formulae and format of required table.
- 2) Laboratory Work: A student is expected to execute the problems on the computer by using MS- EXCEL.

Subject Code: GEC-203
Course Code: BCSE22-203
Paper No. : Electronics Paper– III
Subject Name: Electronic Devices and Circuits -II

Total Contact Hours: 36 hrs. (45 lectures of 48 min)

Credits:02

Teaching Scheme: Theory–03Lect./Week

Total Marks:40+10=50

Learning objectives:-

- i. It presents the principle of circuit analysis and design.
- ii. To learn the basic concepts and characteristics of electronic devices and circuits.
- iii. To analyze transistor amplifier their frequency response
- iv. To verify the theoretical concept through laboratory and simulation experiment

Unit-I A) Field Effect Transistors (18 Hrs.)

Structure and working of: JFET I-V characteristics and parameters (trans-conduction, drain resistance, pinch of voltage, amplification factor) **MOSFETS** (types, construction, characteristics and applications) **Applications:** FET as Voltage Variable resistance (VVR), inverter, switch, memory cell, DRAM, Comparison of BJT-FET-MOSFET.

B) Amplifier & Oscillators

Classification of amplifiers (based on frequency response and Q point) Single stage amplifier & Need of Multistage amplifier, **Coupling Scheme:** (Direct, RC, Transformer coupling in detail) (only circuits using transistors and frequency response). Class A, AB, B, C amplifier study (only from Q point location). Concept of positive and negative feedback (with equations) (only equations, no mathematical analysis). Conditions for sustained oscillations (Barkhausen criterion). RC-phase shift, LC-Colpitt's & crystal oscillator (construction & working, no mathematical analysis, formula only), Applications of oscillators.

Unit-II A) Operational Amplifiers (18 Hrs.)

Concept of Differential amplifier, study of IC741. Concept of operational amplifier (block diagram), pin diagram of IC741, Ideal & practical characteristics & parameters of Op-amp. Linear & Nonlinear applications of op-amp inverting amplifier Virtual ground, sign changer, non-inverting amplifier. Unity gain amplifier, buffer, adder, Subtractor, integrator and differentiator. Comparator (zero & non-zero crossing detector). Phase shift oscillator using op-amp., Schmitt trigger using op-amp. Uploading & downloading.) **Power Supplies :** Rectifier, Working of rectifier (Half, Full, Bridge) in detail & comparison (Without mathematical analysis). Filter circuits & types (study of C & LC filter only) Concept of RC High pass & Low pass Filters Concept of regulation: Line & Load, Zener as regulator, 3-pin positive and negative voltage regulators, SMPS–block diagram & working **UPS:** ON-line & OFF-line (block diagram and different parameters)

Learning outcomes:-

Unit 1:

- i. Understand the concept of rectifier circuits.
- ii. Demonstrate the positive and negative voltage regulator.
- iii. Define the concept of Filters.

Unit 2:

- i. Explain the concept of Amplifier.
- ii. Understand the concept of CE,CB,CC amplifier.
- iii. Define Transistor as a Switch and Transistor as a buffer.
- iv. Define the concept of MOSFET amplifier.

Unit 3:

- i) Define the concept of VVR.
- ii) Explain UJT as sweep generator.
- iii) Understand the types of Oscillator.
- iv) Demonstrate Crystal Oscillator.

Unit 4:

- i) Explain basic concept of Multi vibrator.
- ii) Demonstrate Transistor as A stable Multi vibrator.
- iii) Define the concept of Mono stable Multi vibrator.
- iv) Verify the duty Cycle for A stable Multi vibrator

Reference Books

- 1) Principles of Electronics: A.P.MALVINO, Tata Mc-Graw Hill Publication, 7 Edition.
- 2) A text Book of Applied Electronics R.S.Sheda ,Sch and Publication
- 3) Electronic Device sand circuits by S.Rama Reddy, Narosa publication Dheil
- 4) Principles of Electronics: V.K.Mehets, S.Chand & Company Ltd.
- 5) Basic Electronics and Linear Circuits:N.N.Bhargava, D.C. Kulshreshtha, S.C. Gupta TMH
- 6) Electronic Devices and ciruits: Boyistead, Tata Mc-Graw Hill
- 7) Operational Amlifiers By Ramakant G

Subject Code: GEC-204
Course Code: BCSE22-204
Paper No. : Electronics Paper– IV
Subject Name: Digital Electronics - II

Total Contact Hours: 36 hrs. (45 lectures of 48 minutes)

Credits: 02

Teaching Scheme: Theory–03 Lect./Week

Total Marks:40+10=50

Learning objectives:-

- i. To understand number representation and conversion between different representation in digital electronics circuit
- ii. To analyze logic processes and implement logical operation using combinational logic circuit
- iii. To understand concept of sequential circuit and to analyze sequential system in terms of state machines
- iv. To implement the combinational and sequential circuit

Unit-I A) Multivibrators (18 Hrs.)

Concept & Types of multi vibrator, Pin & block diagram of IC555. Application of IC555: A stable (duty cycle & frequency).

Mono stable (pulse width calculation), Bi stable (switching of states). Crystal clock generation using (single & multi) inverter. Clock generation using NAND/NOR gate

B) Memory devices

Classification & Types of Memory–volatile and non-volatile. SRAM and DRAM (using BJT&MOSFET). Concept of Diode Matrix ROM, PROM, EPROM, & EEPROM, Flash memory. Design main memory from given RAM/ROM size. Speed, capacity and cost range / relation of memory devices

Unit-II A) Introduction to Microprocessors (18 Hrs.)

General block diagram, Introduction & evolution of Micro- processors(4,8,16,32.....Bits)

Features, Pin Diagram and Architecture of 8085 in detail

Features & Brief Architecture of 8086 (no pin diagram)

B) Instruction Set of 8085 & Programming

Instruction format, T-state, Instruction Cycle, Machine Cycle,

Addressing modes, Instruction Set of 8085,

ALP's for Data transfer, Addition, Subtraction, Multiplication, Division, Block Transfer & Exchange operations.

Learning Objectives:

Unit 1:

- i) Understand the concept of Binary Number system used in computer.
- ii) Understand the inter conversion from one number system to another number
- iii) System.
- iv) Define the concept of ASCII code, gray code, etc.
- v) Explain the concept of parity.

Unit 2:

- i) Understand the basic concept of Logic Gates.
- ii) Verify the De Morgans theorem.
- iii) Explain the concept of K-Map.
- iv) Define the logic families and its characteristics.

Unit 3:

- i) Analyze Logic processes and implement logical operations using Combinational logic circuits.
- ii) Explain the concept of Adder.
- iii) Demonstrate the Half adder.
- iv) Define the concept of Analog Multiplexer.

Unit 4:

- i) Define and implement Sequential Logic Circuits.
- ii) Explain the concept of Flip/Flop .
- iii) Understand the Concept of Counter

Reference Books

- 1) Digital principals and applications; Malvino Leach, Tata Mc Graw Hill ,4th Edition
- 2) Fundamentals of Digital Electronics: A.Anand KumarPHIPublication2001
- 3) Digital principals:T.L.Floyd3rdedition

- 4) Digital Electronics: C.F.Strangio
- 5) Modern digital Electronics: R.P.Jain, Tata McGraw Hill Publication
- 6) Digital logic and computer design–Morris Mano
- 7) First course in Digital System Design: John P.Uyemura, Brooke/Cole Thompson Learning (2001)

Practical
Course Code: GEC P2

BCSE22-211: Lab Course-II: Electronics
(Group – A) At least 12 experiments from the following

1. Study of general Electronic components & measurement of Amplitude, Frequency & Phase using CRO.
2. Verification of Kirchhoff's Laws.
3. Verification of Thevenin's Theorem.
4. Positive & Negative Voltage regulators using 3 in IC's
5. Transistors as switch (Application for LED & Relay)
6. Study of full wave rectifier with & without filter (calculation of ripple)
7. Adder & Subtractor using 741.
8. Study of PN diode Characteristics (forward Si & Ge)
9. Transistor Characteristics in CE (calculation of beta & alpha)
10. Characteristics of JFET calculation of parameters
11. Study of crystal oscillator using transistor /gate
12. Design, built and Study Low pass and High pass RC filters
13. Study of Zener diode as a Regulator.
14. Phase shift oscillator using op-amp.
15. Study of Inverting & Non-inverting amplifier using 741.

(Group – B) At least 12 experiments from the following

1. Study of Logic gates
2. Universal building block (NAND & NOR)
3. Verification of De-Morgan's Theorems 4 Study of Flip-Flops (RS, D & JK)
5. Half adder- Subtractor
6. Full Adder- Subtractor (using 7483, 7404)
7. IC 555 as A stable Multivibrator
8. IC 555 as Monostable Multivibrator
9. Study of Shift Register (IC 7495)
10. Multiplexer /De-multiplexer using IC's
11. Study of 4 bit parity checker/ generator using X-OR gate
12. Study of Counter using IC 7490
13. Study of single digit counter. (using 7447, 7490)
14. Arithmetic operations using 8085 kit or simulator
15. Block transfer/exchange using 8085 kit or simulator

Course Code: AECC-B
Subject Code: BCSE22-209
Paper No. : English Paper– II
Subject Name: English for Communication-II

Total Contact Hours: 36 hrs. (45 lectures of 48 min)

Credits: 02

Teaching Scheme: Theory–04Lect./Week

Total Marks:40+10=50

Course Objectives:

1. To acquaint students with communication skills.
2. To inculcate human values among the students through poems and prose.
3. To improve the language and business competence of the students.

Module V

- A) Telephonic Communication
- B) Lost Forest – Johannes Jensen
- C) Stopping by Woods – Robert Frost

Module VI

- A) English for Specific Purposes
- B) Putting Data to Effective Use – Satish Tripathi

Module VII

- A) English for Advertising
- B) An Epithet- W.H. Davies

Module VIII

- A) The Golden Touch –Nathaniel Hawthorne
- B) Offering in the Temple –Desika Vinayakam Pillai

Division of Teaching hours (Total 60 Periods)

1. Communication Skills: 3 X 12 = 36periods
2. Reading Comprehension: 6X4 = 24periods

Course Outcomes:

1. Face job interviews confidentially and efficiently.
2. Acquire soft skills required at workplaces and in real life.
3. Acquire professional skills required in media writing such as writing editorials.