

**DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRPATI SAMBHAJINAGR.**



CIRCULAR NO.SU/B.Sc.Honors/Model College/43/2023

It is hereby inform to all concerned that, the syllabi recommendation of the Dean, Faculty of Science & Technology, the Hon'ble Vice-Chancellor has accepted the **following Revised syllabi under National Education Policy-2020 as per Guidelines of UGC** run at Model College, Ghansawangi Dist.-Jalna in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith.

Sr.No.	Courses	Semester
1.	Honors Degree of B.Sc. Computer Science.	Ist and IInd semester
2.	Honors Degree of B.Sc.Biotechnology	Ist and IInd semester
3.	Honors Degree of B.Sc. Biochemistry	Ist and IInd semester

This is effective from the Academic Year 2023-24 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Chhatrpati Sambhajinagar
431 004.

REF.NO.SU/2023/16418-24
Date:- 01.11.2023.

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Deputy Registrar,
Academic Section

Copy forwarded with compliments to :-

- 1] The Principal of Model College, Ghansawangi, Dist. Jalna
- 2] The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.

Copy to :-

- 1] The Director, Board of Examinations & Evaluation, Dr.BAMU, Chhatrpati Sambhajinagar.
- 2] The Section Officer,[B.Sc.Unit] Examination Branch, Dr.Babasaheb Ambedkar Marathwada University, Chhatrpati Sambhajinagar.
- 3] The Programmer [Computer Unit-1] Examinations, Dr.Babasaheb Ambedkar Marathwada University, Chhatrpati Sambhajinagar.
- 4] The Programmer [Computer Unit-2] Examinations, Dr.Babasaheb Ambedkar Marathwada University, Chhatrpati Sambhajinagar.
- 5] The In-charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr. Babasaheb Ambedkar Marathwada University, Chhatrpati Sambhajinagar.
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- 7] The Record Keeper, Dr. Babasaheb Ambedkar Marathwada University, Chhatrpati Sambhajinagar.

**Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad (M.S.), India**



Structure and Syllabus for B.Sc. (Computer Science)
(Four Years Multidisciplinary Degree Program with Multiple Entry and Exit Option)

**FOUR YEAR BACHELOR OF SCIENCE (B.SC)
COMPUTER SCIENCE**
(For Model College Ghansawangi Dist. Jalna)

**Under the Faculty of
Science and Technology**

Effective from Academic year 2023 – 2024

(As per NEP-2020)

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1. Preamble

Education is the key to development of any society. Role of higher education is crucial for securing right kind of employment and also to pursue further studies in best institutes elsewhere within and outside India.

Quality of higher education in particular deserves high priority to enable the young and future generation of students. This curriculum is to acquire skill, training, knowledge in order to enhance their thinking, creativity, comprehension and application abilities for prepare them to compete, succeed and excel globally.

Sustained initiatives are required to reform the present higher education system for improving and upgrading the academic resources and learning environments.

The Undergraduate Curriculum of National Education Policy 2020 underlines the historical perspective, philosophical basis, and contemporary realities of higher education.

The resultant outcome of this comprehensive exercise undertaken by this curriculum is not only underlines the heart and soul of the NEP 2020 and spirit but also goes on to create a teaching-learning framework at the undergraduate level to attract the young minds towards research, innovation, apprenticeship, social outreach, entrepreneurship and similar such areas of human knowledge and endeavor while imbibing the truly charged academic environ of college life.

The following objectives of NEP are kept in perspective while framing this curriculum.

- To promote each student's holistic development in both academic and non-academic spheres
- To provide flexibility to students so that learners have the ability to choose their learning trajectories and programs, and thereby choose their paths in life according to their talents and interests.
- Multidisciplinary and holistic education to ensure the unity and integrity of all knowledge thereby eliminating harmful silos between different areas of learning
- To promote creativity and critical thinking and to encourage logical decision-making and innovation;
- To promote ethics and human & Constitutional values;

- To promote multilingualism and the power of language in learning and teaching;
- To impart life skills such as communication, cooperation, teamwork, and resilience;
- To promote outstanding research as a corequisite for outstanding education and development.

The below mentioned objectives have been reflected in various features in this curriculum.

- 1. Holistic development of the students**
- 2. Flexibility**
- 3. Multiple entry and exit facility**
- 4. Academic bank of credits**
- 5. Multilingualism**
- 6. Research component**

2. Abbreviations

- 1. GE/OE:** Generic / Open Elective
- 2. VSEC:** Vocational Skill and Skill Enhancement Course
- 3. VSC:** Vocational Skill Courses
- 4. SEC :** Skill Enhancement Courses
- 5. AEC :**Ability Enhancement Course
- 6. IKS:** Indian Knowledge System
- 7. VEC:** Values Education Courses
- 8. OJT:** On job Training: Internship/ Apprenticeship
- 9. FP:** Filed Project
- 10.CEP:** Community Engagement and Service
- 11.CC:** Co-Curricular Courses
- 12.RM:** Research Methodology
- 13.RP:** Research Project

Definitions of Key Words:

a. Academic Year: Two consecutive (one odd + one even) semesters constitute one academic year

b. Course: Usually referred to as 'paper', which is a component of a program. All courses need not carry the same weight. The courses should define learning objectives and learning outcomes. A course may be designed to comprise lectures/ tutorials/laboratory work/ field work/ project work/ vocational training/viva/ seminars/term papers / assignments / presentations/ self-study etc. or a combination of some of these.

c. Credit: A unit by which the course work is measured. It determines the number of hours of instructions required per week in a semester. One credit is equivalent to one hour of lecture or tutorial or two hours of practical work/field work per week in a semester.

d. Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.

e. Credit Point: It is the product of grade point and number of credits for a course.

f. Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.

g. Program: It is a study in a discipline leading to award of a Degree, diploma or certificate.

h. Semester: Each semester will consist of over 16 weeks of academic work equivalent to 90 actual teaching days. The odd semester may be generally scheduled from June to November and even semester from January to May.

i. Semester Grade Point Average (SGPA): It is a measure of performance of work done in a semester. It is the ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places

j. Cumulative Grade Point Average (CGPA): It is a measure of overall cumulative performance of a student over all the semesters of a program. The CGPA is the ratio of total credit points secured by a student in various courses in all the semesters and sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

3. Concepts:

1. Major Subject: A major subject/core subject is the subject that represents the main focus of a degree. A degree in major is permitted if the student opts and accrues courses with minimum of 50% credits corresponding to the major.

2. Minor Subject: A minor is secondary subject that may complement the major or can have interdisciplinary bandwidth. Minors are a bunch of courses and can be related or unrelated to the major. A university must declare the minors and make it available to the students to choose from.

3. Internship: Students at all HEIs will be provided with opportunities for internship in local industries, businesses, banks, artists, crafts persons, and so on. As well as research internships with faculty and researchers at their own or other HEIs/research institution.

4. Generic/Open Elective (OE): Generic or Open Elective shall be a pool/ basket of courses which is meant to provide multidisciplinary or interdisciplinary education to students. GEs or Ses shall consist of pool/ basket of courses offered by the various departments under different discipline/faculty of study.

5. Ability Enhancement Courses (AEC) - Language, Literature & Environment Studies. The courses based upon the content that leads to knowledge enhancement through various areas of study. They are language and literature and environment science and sustainable development which will be mandatory for all disciplines.

6. Indian Knowledge System (IKS): IKS is a generic phrase that covers practically everything about India. While designing the curriculum, it needs to be understood that IKS is not about merely knowing some ancestral knowledge. IKS is also about protecting received wisdom, economic security, and national pride.

7. Vocational and Skill Enhancement Courses (VSEC): In all disciplines/faculties are aimed at providing hands-on-training, competencies, proficiencies and skills to students. The basic purpose of vocational courses is to enhance skill and employability.

8. Internship and apprenticeship: It provides for an industry led, practice oriented and outcome based learning. Forming robust industry-academia linkage. Every HEI will undertake MOUs with industry for industry-institute linkage for promotion of apprenticeship/ Internship/ research/ entrepreneurship/ employment opportunities. There will be 4-6 weeks of structured summer internship in industry or research institute.

9. Field Projects: The field based learning/ projects should attempt to provide opportunities for students to understand the different socio-economic contexts. It should aim at giving student exposure to development-related issues in rural and urban settings. It will provide opportunities for the student to observe situation in rural and urban contexts, and to observe and study actual field situation regarding issues related to socio-economic development.

10. Community engagement and service: Community engagement and service seeks to expose students to the socio-economic issues in society so that the theoretical learning can be supplemented by actual life experiences to generate solutions to real life problems. This component will include participation in activities related to NSS, NCC, adult education/ literacy initiatives and mentoring school students.

(Note: Change in Structure will be applicable as per guidelines of University Grant Commission and State Government of Maharashtra released from time to time)

B. Sc. Computer Science First Year (Semester I) (Level 4.5)
Teaching Scheme

Year/ Semester and Level	Section	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs/ week)	
				Theory	Practical	Total	Theory	Practical
First Year Semester I Level 4.5	Major	DSE-1	NCOM101T	Operating System	03	--	03	--
		DSE-2	NCOM101P	Lab based on O.S.	...	02	--	04
			NCOM102T	Problem Solving using C Language	03	--	03	--
			NCOM102P	C programming Lab	---	02	---	04
	Supportive	Minor-1 Select any one course from Bucket 1	NCOM103T1	Computer Fundamentals	02	--	02	--
			NCOM103T2	Office Automation	02	--	02	--
			NCOM103T3	Digital Literacy	02	--	02	--
			NCOM104T1	Digital Electronics	02	--	02	
	Applied	Generic Elective Select any one Bucket of courses offered as a major	NCOM104T2	R Programming	02	--	02	
			NCOM104T3	Computational Mathematics	02	--	02	
			NCOM105P1	Lab based on Digital Electronics		02		04
			NCOM105P2	Lab based on R Programming		02	--	04

			NCOM105P3	Lab based on Computational Mathematics		02	02	---	04
		VSC	NCOM106T	Aptitude and Reasoning	02	----	02	02	--
AES, VEC, IKS/ Language Curriculum		AEC-1 English	NCOM-ENG-101	English	02				
		L1-MIL	NCOM-MIL-101	Marathi/Hindi	02				
		VEC-1	NCOM-VEC-101	Indian Constitution	02				
		IKS-1	NCOM-IKS-101	Indian Knowledge System	02				
VEC/Life Skill Curriculum		JOC-1	NCOM107T	Presentation Skill	02	----	02	02	---
		CC-1	NCOM108T	Health and wellness	02	----	02	02	---

B. Sc. Computer Science First Year (Semester I) (Level 4.5)

Evaluation/Examination Scheme

[40% Continuous Assessment and 60% of Semester End/ University Assessment]

Year/ Semest er and Level	Section	Course Code	Course Name	Credit		Evaluation Method		Total Mark s	Max mark	Min Mark
				Theory	Practical	CA	UA			
First Year Semeste r I	DSE-1	NCOM101T	Operating System	03		20	30	50	50	20
		NCOM101P	Lab based on O.S.		02	--	50	50	50	20
	DSE-2	NCOM102T	Problem Solving using C Language	03		20	30	50	50	20
		NCOM102P	C programming Lab	-----	02	---	50	50	50	20
Level 4.5	Minor-1 Select any one course from Bucket 1	NCOM103T1	Computer Fundamentals	02	---	20	30	50	50	20
		NCOM103T2	Office Automation							
		NCOM103T3	Digital Literacy							
	Generic Elective Select any one Bucket of courses offered as a major	NCOM104T1	Digital Electronics	02	---	20	30	50	50	20
		NCOM104T2	R Programming							
		NCOM104T3	Computational Mathematics							

Applied	SEC (Choose any one from bucket of major)	NCOM105P1	Lab based on Digital Electronics	---	02	---	50	50	50	20
		NCOM105P2	Lab based on R Programming							
		NCOM105P3	Lab based on Computational Mathematics							
	VSC	NCOM106T	Aptitude and Reasoning	02	--	20	30	50	50	20
AES,VEC, IKS/ Language Curriculu m	AEC-1 English	NCOM-ENG- 101	English	02	---	20	30	50	50	20
	L1-MIL	NCOM-MIL- 101	Marathi/Hindi	02	---	20	30	50	50	20
	VEC-1	NCOM-VEC- 101	Indian Constitution	02	...	20	30	50	50	20
VEC/Life Skill Curriculu m	IKS-1	NCOM-IKS- 101	Indian Knowledge System	02	...	20	30	50	50	20
	JOC-1	NCOM107T	Presentation Skill	02	---	20	30	50	50	20
	CC-1	NCOM108T	Health and wellness	02	---	20	30	50	50	20
Total Marks							700	700	280	

B. Sc. Computer Science First Year (Semester II) (Level 4.5)

Teaching Scheme

Year/ Semester and Level	Section	Course Code	Course Name	Credits Assigned		Teaching Scheme (Hrs/ week)	
				Theory	Practical	Theory	Practical
First Year Semester II Level 4.5	Major			03	--	03	--
		DSE-3	Data Structure	03	--	03	--
		NCOM201T	Data Structure	03	--	03	--
		NCOM201P	Lab based on Data Structure	02	02	--	04
		NCOM202T	OOPs using C++	03	--	03	--
	Supportive	NCOM202P	C++ programming Lab	---	02	---	04
		NCOM203T1	Hardware Maintenance	02	--	02	--
		NCOM203T2	Web designing	02	--	02	--
		NCOM203T3	DTP and Multimedia	02	--	02	--
		NCOM204T1	8085 Microprocessor	02	--	02	--
	Generic Elective /OE-2 Select any one Bucket of courses offered as a major	NCOM204T2	Data Visualization	02	--	02	--
		NCOM204T3	Computational Statistics	02	--	02	--

Applied	SEC-2 (Choose any one from Bucket of major)	NCOM205P1	Lab based on 8085 Microprocessor	02	02	02	04
		NCOM205P2	Lab based on Data Visualization	02	02	--	04
		NCOM205P3	Lab based on Computational Statistics	02	02	---	04
	VSC	NCOM206T	Web designing	02	02	02	--
AES,VEC, IKS/ Language Curriculum	AEC-2 English	NCOM-ENG-201	English	02			
	L2-MIL	NCOM-MIL-201	Marathi/Hindi	02			
	VEC-2	NCOM-VEC-201	Environment Education	02			
	IKS-2	NCOM-IKS-201	Indian Knowledge System	02			
VEC/Life Skill Curriculum	VOC-1	NCOM207T	Personality Development & Interview Techniques	02	02	02	---
	CC-2	NCOM208T	Yoga Education/Sports and Fitness	02	02	02	---

B. Sc. Computer Science First Year (Semester II) (Level 4.5)
Evaluation/Examination Scheme
[40% Continuous Assessment and 60% of Semester End/ University Assessment]

Year/ Semester and Level	Section	Course Code	Course Name	Credit		Evaluation Method		Total Mark s	Max mark	Min Mark
				Theory	Practical	CA	UA			
First Year Semester II Level 4.5	Major	DSE-3	Data Structure	03		20	30	50	50	20
		NCOM201P	Lab based on Data Structure		02	--	50	50	50	20
		NCOM202T	OOPs using C++	03		20	30	50	50	20
		NCOM202P	C++ programming Lab	-----	02	---	50	50	50	20
	Supportive	NCOM203T1	Hardware Maintenance	02	---	20	30	50	50	20
		NCOM203T2	Web designing							
		NCOM203T3	DTP and Multimedia							
	Generic Elective /OE-2 Select any	NCOM204T1	8085 Microprocessor	02	---	20	30	50	50	20
		NCOM204T2	Data Visualization							

	one Bucket of courses offered as a major	NCOM204T3	Computational Statistics										
Applied	SEC-2	NCOM205P1	Lab based on 8085 Microprocessor	---	02					50	50	50	20
	(Choose any one from	NCOM205P2	Lab based on Data Visualization										
	Bucket of major)	NCOM205P3	Lab based on Computational Statistics										
AES,VEC, IKS/ Language Curriculum	VSC	NCOM206T	Web designing	02	--					30	50	50	20
	AEC-2 English	NCOM-ENG- 201	English	02	---					30	50	50	20
	L2-MIL	NCOM-MIL- 201	Marathi/Hindi	02	---					30	50	50	20
	VEC-2	NCOM-VEC- 201	Environment Education	02	...					30	50	50	20
	IKS-2	NCOM-IKS- 201	Indian Knowledge System	02	...					30	50	50	20
VEC/Life Skill Curriculum	VOC-1	NCOM207T	Personality Development & Interview Techniques	02	---					30	50	50	20
	CC-2	NCOM208T	Yoga Education/Sports and Fitness	02	---					30	50	50	20
										Total Marks		700	280

Bucket 1: Minor Subject

* Students will have to choose one subject from Bucket 1 as a Minor subject, from same faculty or discipline or other than DSC (in col. 3)

Semester	Details of Minor Subject	
	Code	Title of Subject
I Semester	NCOM103T1	Computer Fundamentals
	NCOM103T2	Office Automation
	NCOM103T3	Digital literacy
II Semester	NCOM203T1	Hardware Maintenance
	NCOM203T2	Web Designing
	NCOM203T3	DTP and Multimedia

Bucket 2: Generic Elective course (GE)

* Students will choose one GE course offered as a generic major

Semester	Details of Generic Elective	
	Code	Title of Subject
I Semester	NCOM104T1	Digital Electronics
	NCOM104T2	R Programming
	NCOM104T3	Computational Mathematics
II Semester	NCOM204T1	8085 Microprocessor
	NCOM204T2	Data Visualization
	NCOM204T3	Computational Statistics

Bucket 3: Skill Enhancement Course (SEC)

Student should Choose any one from pool of Major

Semester	Details of Skill Enhancement Course (SEC)	
	Code	Title of Subject
I Semester	NCOM105P1	Lab based on Digital Electronics
	NCOM105P2	Lab based on R Programming
	NCOM105P3	Lab based on Computational Mathematics
II Semester	NCOM205P1	Lab based on 8085 Microprocessor
	NCOM205P2	Lab based on Data Visualization
	NCOM205P3	Lab based on Computational Statistics

Curriculum AES,VEC,IKS/Language

Semester	Name of Subject	Details of Skill Enhancement Course (SEC)	
		Code	Title of Subject
I Semester	AEC-1 English	NCOM-ENG-101	English
	MIL –Marathi /Hindi	NCOM-MIL-101	Marathi/ Hindi
	VEC	NCOM-VEC-101	Constitution of India
	IKS	NCOM-IKS-101	Indian Knowledge System
II Semester	AEC-2 English	NCOM-ENG-102	English
	MIL –Marathi /Hindi	NCOM-MIL-102	Marathi/ Hindi
	VEC	NCOM-VEC-101	Environment Education
	IKS	NCOM-IKS-101	Indian Knowledge System

5. Vision

Framing and implementation of curricula and syllabi is envisaged to provide an understanding of the basic connection between theory and experiment and its importance in understanding the foundation of computing. This is very critical in developing a scientific temperament and to venture a career which a wide spectrum of applications as well as theoretical investigations. The undergraduate curriculum provides students with theoretical foundations and practical experience in both hardware and software aspects of computers.

6. Mission

The curriculum in computer science is integrated with courses in the sciences and the humanities to offer an education that is broad, yet of enough depth and relevance to enhance student employment opportunities upon graduation. As a Bachelor's degree

program, the curriculum is based on the criterion that graduates are expected to function successfully in a professional employment environment immediately upon graduation.

7. Eligibility:

1. He/ She must have passed the higher secondary (multipurpose) examination conducted by H.S.C. board Government of Maharashtra with science / technical subjects Or an Examination of any statutory University and Board recognized as equivalent thereto.

OR

2. He/She must have passed examination prescribed at the end of second year of the junior college conducted by the H.S.C. board, Government of Maharashtra with English, Second language, Physics, Chemistry, Mathematics and or Biology or one of the technical subjects prescribed at the said examination as the optional or elective subjects or an examination recognized as equivalent thereto.

8. Duration

The undergraduate program in Computer Science is offered through the courses designed for granting the following B.Sc Computer Science. The duration of the program is 4 years or 8 semesters. Students who desire to undergo a 3-year UG Programme will be allowed to exit after completion of the 3rd year. If a student wants to leave after the completion of the first or second year, the student will be given a UG Certificate or UG Diploma, respectively, provided they secure the prescribed number of credits. Students who exit with a UG certificate or UG diploma are permitted to re-enter within three years and complete the degree programme.

UG Certificate: Students who opt to exit after completion of the first year and have secured 60 credits will be awarded a UG certificate,

UG Diploma: Students who opt to exit after completion of the second year and have secured 120 credits will be awarded the UG diploma.

3-year UG Degree: Students who wish to undergo a 3-year UG programme will be awarded UG Degree in the Major discipline after successful completion of three years, securing 180 credits.

4-year UG Degree (Honours): A four-year UG Honours degree in the major discipline will be awarded to those who complete a four-year degree programme with 224 credits.

4-year UG Degree (Honours with Research): Students who choose a research stream in the fourth year. They should do a research project or dissertation under the guidance of a faculty member of the University/College. The research project/dissertation will be in the major discipline. The students who secure 224 Credits.

9. Medium of Instructions

The medium of instruction for this course is English.

10. Attendance

A candidate is required to put in a minimum of 75% of attendance in both theory papers practical separately in each subject before admission to the examination. This relaxation in attendance includes for medical & any other reasons approved by the head of the Institution. A candidate lacking in the prescribed attendance and progress in any one of the subjects in theory and practical in the first appearance shall not be permitted for admission to the entire examination.

11. Evaluation Methods/ Scheme of Examination, Earning Credits, Grading System

Continuous assessment methods that are appropriate to a given disciplinary/subject area and a programme of study will be used to assess progress toward the course/programme learning outcomes. Priority will be accorded to formative assessment.

Evaluation will be based on continuous assessment, in which sessional work and the semester end examination will contribute to the final grade. Sessional work will consist of weekly class tests, mid-semester examination(s), homework assignments, etc., as determined by the faculty in charge of the courses of study. Progress towards achievement of learning outcomes will be assessed using the following: time-constrained examinations; closed-book and open-book tests; problem-based assignments; practical assignment laboratory reports; observation of practical skills; individual project reports (case-study reports); team project reports; oral presentations, including seminar presentation; viva voce interviews; computerized adaptive assessment, examination on demand, modular certifications, etc.

The Semester Grade Point Average (SGPA) is computed from the grades as a measure of the student's performance in a given semester. The SGPA is based on the grades of the current term, while the Cumulative GPA (CGPA) is based on the grades in all courses taken after joining the programme of study.

Letter Grade	Grade Point
O (outstanding)	10
A+ (Excellent)	9
A (Very good)	8
B+ (Good)	7
B (Above average)	6
C (Average)	5
P (Pass)	4
F (Fail)	0
Ab (Absent)	0

Computation of SGPA and CGPA

The following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i. **The SGPA is the ratio of the sum** of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

$$\text{SGPA (Si)} = \sum(C_i \times G_i) / \sum C_i$$

Where C_i is the number of credits of the i th course and G_i is the grade point scored by the student in the i th course.

ii. **The Cumulative Grade Point Average (CGPA)** is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$$\text{CGPA} = \sum(C_i \times S_i) / \sum C_i$$

where S_i is the SGPA of the i th semester and C_i is the total number of credits in that semester

12. Programme Outcomes (POs):

PO 1 : Gain a complete exposure to the theories and practices of Computer science.

PO 2: Get transformed into a skilled learner and active programmer, enabling the students to focus on their higher studies.

PO 3 : Value computer professionals and programmers.

PO 4 : Explore how the concepts and applications of Computer science lead to innovative thinking with a problem-solving attitude

Programme Specific Outcomes (PSOs) Certificate in Science

PSO 1: Bridge the fundamental concepts of computers with the present level of knowledge of the students.

PSO 2: Illustrate the process of problem-solving using C and apply solutions to real world problems.

PSO 3: Apply applications for a range of problems using operating system.

PSO 4: Understand various techniques of analysis.

Programme Specific Outcomes (PSOs)
Diploma in Computer Science

PSO 1: Understand Digital electronic and hardware system.

PSO 2: Remember and understand the basics of computer organization and Design.

PSO 3: Learn fundamentals of Database Management System

PSO 4: Create, Maintain, and query MySQL database

Programme Specific Outcomes (PSOs)
Bachelor of Science (with specialization in Computer Science)

PSO 1 : To Gain knowledge of the fundamentals and intermediate-level concepts of Computer Science would have enhanced.

PSO 2: To understand the basics and intermediate-level soft skills.

PSO 3: To understand of the traditional and current technologies and practices in the world of Computers and digital platforms.

PSO 4: To view the real-world problems from the spectacles of conceptual knowledge of Computer Science and to develop their solutions in a technical oriented way

Curriculum of Semester –I

Course Code: NCOM101T

Section: DSC1

Course Title: Operating System

Total Credits: 03

Contact Hours: 45 (Clock Hours)

Marks: 50 UA: 30 CA: 20

Periods: 45 (45 minutes each)

Objective: Describe the important computer system resources and the role of operating system in their management policies and algorithms. To understand various functions, structures and history of operating systems and should be able to specify objectives of modern operating systems and describe how operating systems have evolved over time. Understanding of design issues associated with operating systems. Understand various process management concepts including scheduling, synchronization, and deadlock.

Unit-I: Introduction to Software: (05 periods)

Software: Definition, classification of software, operating system as the main component of system software.

Unit-II: Operating System Fundamental (10 periods)

Operating Systems: OS as a resource manager, Structure of OS, Evolution of OS, OS functions, Characteristics of modern OS, Types of O.S.: Early systems, simple batch systems, multiprogramming batch systems, Time sharing system, Personal Computer systems, Parallel systems, Distributed systems, Real time systems.

Unit-III: I/O Management (10 periods)

I/O Management I/O System Components : I/O Devices , I/O, Hardware , Application I/O interface, Secondary Storage Structure : Disk fundamental, Disk Scheduling , Disk Management Device Characteristics Input and Output devices, Storage devices, Device allocations, I/O scheduler, Introduction to Virtual Devices, Dedicated Devices, shared devices and virtual devices, Generalized strategies.

Unit-IV: Process Management and Memory Management (15 periods)

Concept of Process: Process State, Operation on Processes, thread.
CPU Scheduling: Types of Schedulers, Criteria for scheduling, Scheduling Algorithms. Process

UNIT-5: DOS operating system (05 periods)

Structure of DOS operating system. DOS Internal commands DOS External commands Case study on DOS operating system.

Reference Books:

1. Operating System Concept – By Abraham & Peter B. Galvin (8th Edition)
2. Operating System – By Stuart Madnick & Donovan
3. Operating System Concept – By Achyut S Godbole (2nd Edition)
4. Operating System Concept – By William Stallings (4th Edition)

Course Code: **NCOM101P**

Section: **DSE1(Lab)**

Course Title: **Lab course 1 (Lab based on Operating System)**

Total Credits: 02

Contact Hours: 04 Hours (Week)

Marks: 50 UA: 50

1. Student should prepare a report based on computer component such as monitor, printer, CPU, Pen drive, CD –ROM , Hard Disk
2. Practical for computer formatting
3. Prepare the comparative report on windows and DOS operating system
4. Practical for password reset using CMOS battery
5. Practical based on removing and inserting RAM in the computer.
6. Execution of DOS internal and External commands
7. Practical on office tool
8. Practical based on email sending
9. Practical based on online meeting using zoom, Google meet and skype
10. Practical based on remote desktop using any desk software.

Course Code: NCOM102T

Section: DSE2

Course Title: Problem Solving Using C

Total Credits: 03

Contact Hours: 45 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: To expose students to algorithmic thinking and problem solving and impart moderate skills in programming using C Language in an industry-standard. Introduce students to learn basic features, Create, execute simple C programs using conditional statements, loops and arrays.

Unit-I: Introduction (10 periods)

An Overview of C , History of Programming language type, C as a Structured Language, Features of C. Data Types Data Types: int, char, float, double. Declaration & Initialization, Example.

Unit-II: Operator in C (05 periods)

Character set, C Token, Identifier & Keywords, Variables, Constant and its types. Integer constant, floating point constant, character constant, string constants, Operators: Arithmetic, Relational, Logical, Unary operators, Increment & decrement Assignment and Conditional operator

Unit-III :C Program & I/O statements (10 periods)

Structure of C Program, Compilation & Execution of C program, I/O: Introduction, Formatted Input/output function: scanf & printf, Escape sequence characters.

Unit-IV: Control and Iterative Statements(10 periods)

Simple if, nested if, if-else, else if ladder, Switch-case statement, The conditional expression (? : operator),while and do-while loop, and for loop, break & continue statement, goto statement

Unit-V: Arrays Introduction(10 periods)

Declaration and initialization Accessing array elements, Memory representation of array. One dimension and multidimensional arrays, character array, Introduction to string

Reference Books:

1. Kanitkar "Let Us C"
2. Balaguru Swami "Ansi C"
3. Khanale "Programming in C"

Course Code: NCOM102P

Section: DSE2(Practical)

Course Title: Lab course 2 (Lab based on C Programming)

Total Credits: 2

Contact Hours: 04 Hours (Week)

Marks: 50 (UA: 50)

Objective: Student understands the practical and logical application of programming language. The use of C logical statement in real time example solving. The student should understand the working of logic gate with its application in real time era.

Practical based Basic C Programming

1.Installation of C Program:

Download and installation of C programming software. Discussion on available c software and use of each individually.

2. Input Output statement program

Minimum 10 program on input and output statement, data type and constant.

3.List of Program for student to understand the concept of programing

- Find Area, Perimeter of Triangle & Rectangle.
- Find maximum amongst 3 numbers.
- Program for nested loops.
- Program to Calculate x y
- Program to check Prime Number, Program reverse of digit.
- Program to find Armstrong Number.
- Program to print the Fibonacci Series
- Searching and element from array.
- Transpose of matrices
- Multiplication of matrices
- Sorting array using the bubble sort technique
- Program for factorial of number

Course Code: NCOM103T1

Course Title: Computer Fundamentals

Section: Minor 1

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: To impart basic introduction to computer hardware, components, computer number system, how the CPU works, fundamental about algorithms and flowchart as well as different type of software.

UNIT-1: Introduction to Software: (10 period)

Definition of Software, Types of Software-System software, Application software and Utility software.

UNIT-2: Software: (10 period)

Definition of Software, Types of Software-System software, Application software and Utility software. Computer Languages: Definition, types of Programming languages, Language Processors: Assemblers, Interpreters, Compiler and Editors. Introduction to Operating Systems: Types of Operating System, Functions of Operating System examples. MS-DOS Internal and External Commands.

UNIT-3: Introduction to Operating System: (10 period)

Computer Languages: Definition, types of Programming languages, Language Processors: Assemblers, Interpreters, Compiler and Editors.

Introduction to Operating Systems: Types of Operating System, Functions of Operating System examples. MS-DOS Internal and External Commands.

UNIT-3:Internet, World Wide Web: (10 period)

Introduction to Internet, Internet Access, Internet Basics, Protocols-TCP/IP,HTTP,FTP, Addressing, World Wide Web(WWW), Web Pages & HTML, Web browsers, Searching for information-search engines. Internet chat. Applications of Internet. Advantages and Disadvantages of Internet

UNIT-4: Number Systems and Arithmetic (10 period)

Decimal Number System & Binary Number System, Decimal to Binary conversion, Binary to Decimal Conversion. Binary Arithmetic : Binary addition, subtraction, Multiplication & division Hexadecimal number system , Hexadecimal to binary, Binary to Hexadecimal, Hexadecimal to decimal conversion Binary subtraction using 1' complement, 2'scomplement method.

UNIT-5: Email Services (05 period)

Introduction, Domain, Account creation, sending mail, drafting mail. Holiday mail reminder.

References

1. Fundamentals of Computers, V. Rajaraman 6th edition PHI Learning Private Limited 2014
2. Fundamentals of Information Technology ByChetanSrivastava, Kalyani Publishers
3. Fundamentals of Computers By V.Rajaraman, PHI Publication ,IVth Edition.

Course Code: **NCOM103T2**

Course Title: **Office Automation**

Section: Minor 1

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: The course introduces the students to document processing, presentation software and data handling. The basic features and skills of creating, editing, inserting tables, graphics as well as presentation tools along with spreadsheet data handling are covered.

UNIT-1: Introduction to Ms-Word: (10 period)

Introduction to Ms-Word: Uses of Ms- Word, Introduction to Ms-Word Windows:

Title bar, Menu bar, Toolbar, Standard Toolbar, Formatting toolbar, The Ruler bar, Insertion point, Scroll Bars, The status bar, Dialog Boxes: Command buttons, check boxes, Drop-down lists, tabs, radio Buttons, Increment buttons, Wizards and Templates, Basic Text Editing: Cut, Copy, Paste, Undo, Redo, Delete

UNIT-2: Formatting:: (05 period)

Formatting: Character formatting by using Font dialog box, Paragraph Formatting by using Keeping text together, Adding borders and shading, page and section formatting, page setup, Numbering pages.

UNIT-3: Introduction to Power point: (05 period)

Introduction to Power point: Creating PowerPoint Presentation.

Introduction to MS-Access (05 period)

Introduction to MS-Access

Creation Of files in Ms-Access.

UNIT-3: Working with Tables and Columns: (10 period)

Working with Tables and Columns: History of table, creating a table, entering text in a table using table tools, Changing column's width with Auto fit, Gridlines, Merging Cells, Table Formatting:-Sorting tables, copying tables, deleting tables, Mail merge

UNIT-4: Introduction to Ms-Excel (10 period)

Introduction to Ms-Excel: Spreadsheet overview, starting excel, creating spreadsheet, excel menu, Working with Formulas and Functions: Introduction using basic formulae, advance formulae, designing formulae, Formatting: Types of formatting: 1. Using borders, color and patterns

Reference Books:

1. Microsoft Office 2000 By Complete (Bpb)
2. Mastering Word 2000 By Mansfield (Bpb)
3. Teach Yourself Ms-Excel 2000 In 24 Hours (Bpb)

Course Code: NCOM103T3

Course Title: Digital Literacy

Section: Minor 1

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: The course objective is to understand the fundamental concepts of computer and its relevant applications in real life.

UNIT-1: Computer Fundamentals: (10 period)

Computer Fundamentals: History and Generations of Computer, Architecture of the Computer, Description of Different parts of a computer.

Idea about System Software and Application Software. Operating system concept (Basic knowledge), Fundamentals of Electricity, About AC and DC

UNIT-2: SMPS Features:: (05 period)

SMPS Features, Functions, Types of SMPS, Power distribution in SMPS, Components and Circuits inside the SMPS Unit, Types of UPS Offline, Line Interactive & Online, Working Principle of each type of UPS..

UNIT-3: Memory of Computer: (05 period)

Introduction to RAM, ROM, Cache Memory, Buffer Memory, Virtual Memory. Speed, Timeline (EDO, NON-EDO, SD, RD, DDR, DDR2, DDR3, DDR4), Hybrid Memory

UNIT-3: Introduce the Networking: (10 period)

Introduce the Networking concept: including sharing of different resources, use of Internet, accessing/ browsing, downloading and e-mailing

UNIT-4: Computer application for Biotechnology and Biochemistry (10 period)

Introduction to Bioinformatics,
Computer applications in Biotechnology
Computer applications in Biochemistry
Statistical software for Biotechnology and Biochemistry

References

1. Fundamentals of Computers, V. Rajaraman 6th edition PHI Learning Private Limited 2014
2. Fundamentals of Information Technology ByChetanSrivastava, Kalyani Publishers

Course Code: NCOM104T1

Course Title: Digital Electronic

Section: Generic/ OE--1

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: To convey basic introduction of computer system architecture, the structure of computer, working gates and its functionality. To impart basic knowledge in digital logic and circuits and to introduce basic concepts of data communications. Student will be able to learn basic concepts of digital logic and the design of basic logic circuits using commonly used combinational and sequential circuits.

Unit-I: Boolean Algebra Theorem: (05 periods)

Postulates of Boolean Algebra Theorems of Boolean Algebra: Complementation , commutative, AND, OR, Associative, Distributive ,Absorption laws , DE Morgan's theorems, Reducing Boolean expressions

Unit-II: Logic Gates: (10 periods)

Logic Gates : AND, OR, NOT, Ex-OR, Ex-NOR, NAND as Universal building block Logic diagrams of Boolean expressions Boolean expressions for logic diagrams

Unit-III: Combinational and Sequential circuit (10 periods)

Introduction of Minimization techniques, Minterms and Maxterms, K-Map, K-Map for 2,3 and 4 variable.

Combinational circuit and sequential circuit introduction, Half adder, half subtractor, Full Adder ,Full Subtractor, Multiplexer, demultiplexer, encoder, decoder, BCD to Decimal decoder 2 : 4 demultiplexer,4 line to 1 line multiplexer

Unit-IV: Flip Flops (10 periods)

Introduction : RS FF,Clocked RS FF, D Flip Flops,Triggering, preset and clear,JK FF , T FF,Race around Condition

Unit-V Counters Introduction:(10 periods)

Asynchronous/ ripple counter Modulus Counter , MOD-12 counter, Synchronous counter : Synchronous serial & synch parallel counterbid counter, Ring counter.

Core Reference:

1. Digital Electronics and Micro-Computers – R.K.Gaur ,DhanpatRai Publication
2. Digital fundamentals –Floyd & Jain –Pearson Education
3. Introduction to computers –Norton –McGraw Hill
4. Digital fundamentals –Floyd & Jain –Pearson Education

Additional Reference:

1. Digital Electronics and Logic Design – N.G.Palan ,Technova Publication
2. Computer fundamentals –B.Ram –New Age International

Course Code: **NCOM104T2**

Section: Generic/ OE--1

Course Title: **R Programming**

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: This course introduces R, which is a popular statistical programming language. The course covers data reading and its manipulation using R, which is widely used for data analysis internationally. The course also covers different control structures and design of user-defined functions. Loading, installing and building packages are covered.

Unit-I: Introduction: (10 periods)

Introduction: R interpreter, Introduction to major R data structures like vectors, matrices, arrays, list and data frames, Control Structures, vectorized if and multiple selection, functions.

Unit-II: Installing, loading and using packages: (10 periods)

Installing, loading and using packages: Read/write data from/in files, extracting data from web-sites, Clean data, Transform data by sorting, adding/removing new/existing columns, centring, scaling and normalizing the data values, converting types of values, using string in-built functions, Statistical analysis of data for summarizing and understanding data, Visualizing data using scatter plot, line plot, bar chart, histogram and box plot

Unit-III: Designing GUI (10 periods)

Designing GUI: Building interactive application and connecting it with database

Unit-IV: Building Packages (10 periods)

Building Packages

Unit-V Conditional and Control Structure:(05 periods)

Conditional such as if, if-else , nester if-else and control structure in R.

References

1. Cotton, R., Learning R: a step by step function guide to data analysis. 1st edition. O'reilly Media Inc.

Additional Resources:

2. Gardener, M.(2017). Beginning R: The statistical programming language, WILEY.
3. Lawrence, M., & Verzani, J. (2016). Programming Graphical User Interfaces in R. CRC press. (ebook)

Course Code: **NCOM104T3**

Section: **Generic/ OE--1**

Course Title: **Computational Mathematics**

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: To get the knowledge about the Sets, matrices, relational functions etc..To study the basics of differential and integral calculus.

Unit-I: Set Theory: (10 periods)

Set Theory: Introduction, Basic Concepts, Terminology and notation, Sub set, Operation on sets

Algebra sets, Venn Diagram, Collection of sets, Multiset, Countable and Uncountable sets, Ordered pairs and Cartesian product, Computer representation of sets, fuzzy sets

Unit-II: Relation and Function: (10 periods)

Relation and Function: Introduction, Relations on Sets, Some operations on sets, Types of Relations in a set, Properties of Relations, Representation of Relations, Composition of Relations, Closure of Relations

Unit-III: Function (10 periods)

Function: Introduction, Classification of Functions, Types of Functions, Composition of Functions, Recursively defined function, Some Special Function.

Unit-IV: Graph Theory: (10 periods)

Graph Theory: Introduction, Basic terminology, Simple graph, Multigraph, pseudo graph, Degree of vertex, Types of Graphs, Subgraphs and Isomorphic graphs, Operation of Graphs

Unit-V :Trees:(05 periods)

Trees: Introduction, Trees and their properties, Spanning Tree, Binary Tree, Tree Traversal

Reference Books:

1. Swapan Kumar Sarkar, S.Chand "A Textbook of Discrete Mathematics"
2. Tremblay and Manohar, McGraw Hill "Discrete Mathematical Structures with Application to Computer Science"
3. Erwin Keryzig "Advanced Engineering Mathematics"
4. K.D.Joshi "Foundations of Discrete Mathematics" Wiley Eastern Ltd

Course Code: **NCOM105P1**

Section: SEC-1

Course Title: **Lab on Digital Electronic**

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (UA: 50)

Periods: 45 (45 minutes each)

Objective: To understand the practical knowledge and its implementation of Digital Electronics.

1. Study of Logic gates and their ICs and universal gates:

- a. Study of AND, OR, NOT, XOR, XNOR, NAND and NOR gates
- b. IC 7400, 7402, 7404, 7408, 7432, 7486, 74266
- c. Implement AND, OR, NOT, XOR, XNOR using NAND gates.
- d. Implement AND, OR, NOT, XOR, XNOR using NOR gates

2. Implement the given Boolean expressions using minimum number of gates.

- a. Verifying De Morgan's laws.

- b. Implement other given expressions using minimum number of gates.
- c. Implement other given expressions using minimum number of ICs.

3. Implement combinational circuits.

- a. Design and implement combinational circuit based on the problem given and minimizing using K-maps.

4. Implement code converters.

- a. Design and implement Binary – to – Gray code converter.
- b. Design and implement Gray – to – Binary code converter.
- c. Design and implement Binary – to – BCD code converter
- d. Design and implement Binary – to – XS-3 code converter

5. Implement Adder and Subtractor Arithmetic circuits.

- a. Design and implement Half adder and Full adder.
- b. Design and implement BCD adder.
- c. Design and implement XS – 3 adder.
- d. Design and implement binary subtractor.
- e. Design and implement BCD subtractor

6. Implement Arithmetic circuits.

- a. Design and implement a 2-bit by 2-bit multiplier.
- b. Design and implement a 2-bit comparator.

7. Implement Encode and Decoder and Multiplexer and Demultiplexers.

- a. Design and implement 8:3 encoder.
- b. Design and implement 3:8 decoder.
- c. Design and implement 4:1 multiplexer.

d. Design and implement 1:4 demultiplexer. Study of IC 74139

8. Study of flip-flops and counters.

a. Study of IC 7473.

b. Study of IC 7474.

c. Study of IC 7476.

9. Study of counter ICs and designing Mod-N counters.

a. Study of IC 7490, 7492, 7493 and designing mod-n counters using these.

b. Designing mod-n counters using IC 7473 and 7400 (NAND gates)

10. Design of shift registers and shift register counters.

a. Design serial – in serial – out, serial – in parallel – out, parallel – in serial – out, parallel – in parallel – out and bidirectional shift registers using IC 7474.

Course Code: NCOM105P2

Section: SEC-1

Course Title: Lab on R Programing

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (UA: 50)

Periods: 45 (45 minutes each)

Objective: To understand the practical knowledge and its implementation of R Programming

1. Introduction to R Programming

Getting Used to R: Describing Data

2. Viewing and Manipulating Data

Plotting Data

Reading in Your Own Data

3. Visualizing Data

Tables, charts and plots. Visualising Measures of Central Tendency, Variation, and Shape. Box plots, Pareto diagrams. How to find the mean median standard deviation and quantiles of a set of observations. Students may experiment with real as well as artificial data set

4. Probability Distributions

Generate and Visualize Discrete and continuous distributions using the statistical environment. Demonstration of CDF and PDF uniform and normal, binomial Poisson distributions. Students are expected to generate artificial data using and explore various distribution and its properties. Various parameter changes may be studied.

5. Densities of Random Variables

Off the Shelf Distributions in R

Matching a Density to Data

More About Making Histograms

6. Binomial Distribution

Study of binomial distribution. Plots of density and distribution functions. Normal approximation to the Binomial distribution.

7. Building Confidence in Confidence Intervals

Populations Versus Samples

Large Sample Confidence Intervals

Simulating Data Sets

Evaluating the Coverage of Confidence Intervals

8. Perform Tests of Hypotheses

How to perform tests of hypotheses about the mean when the variance is known.

9. Correlation

How to calculate the correlation between two variables. How to make scatter plots.

Use the scatter plot to investigate the relationship between two variables

10. Estimating a Linear Relationship

A Statistical Model for a Linear Relationship

Least Squares Estimates

The R Function lm

Course Code: NCOM105P3

Section: SEC-1

Course Title: Lab on Computational Mathematics

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (UA: 50)

Periods: 45 (45 minutes each)

**Objective: To understand the practical knowledge and its implementation
Computational Mathematics**

Course objective

On completion of the course, student will be able to:

- Understand the theoretical concepts in Graph theory and Calculus.
- Apply this knowledge in various courses of Computer Science

Practical 1: Graphs and operations on graphs

Practical 2 :Connected graphs

Practical 3 :Eulerian and Hamiltonian graphs

Practical 4: Trees-I

Practical 5: Trees-II

Practical 6 :Introduction to Scilab

Practical 7 :Relations and Functions

Practical 8: Continuity and Differentiability

Practical 9 :Mean value theorems and L'Hospital rule

Practical 10: Successive differentiation

Course Code: NCOM106T

Section: VSC

Course Title: Aptitude and Reasoning

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: This course is designed to suit the need of the outgoing students and to acquaint them with frequently asked patterns in quantitative aptitude and logical reasoning during various examinations and campus interviews..

Unit-I: : Quantitative Ability (Basic Mathematics) (10 periods)

- 1.1. Number Systems
- 1.2. LCM and HCF
- 1.3. Decimal Fractions
- 1.4. Simplification
- 1.5. Square Roots and Cube Roots
- 1.6. Average
- 1.7. Problems on Ages
- 1.8. Surds & Indices
- 1.9. Percentages
- 1.10 Problems on Numbers

Unit-II: Quantitative Ability-I (Applied & Engineering Mathematics) (10 periods)

- 2.1. Logarithm
- 2.2. Permutation and Combinations
- 2.3 Probability

Unit-III: Quantitative Ability-II (Applied & Engineering Mathematics) (05 periods)

- 3.1 Profit and Loss
- 3.2 Simple and Compound Interest
- 3.3 Time, Speed and Distance
- 3.4 Time & Work
- 3.5 Ratio and Proportion
- 3.6 Area

Unit-IV: Logical Reasoning (Deductive Reasoning): (10 periods)

- 4.1. Analogy
- 4.2. Blood Relation
- 4.3 Directional Sense
- 4.4. Number and Letter Series
- 4.5. Coding – Decoding
- 4.6. Calendars
- 4.7. Clocks
- 4.8. Venn Diagrams
- 4.9. Seating Arrangement
- 4.10. Syllogism
- 4.11. Mathematical Operations

Unit-V: Data Interpretation (10 periods)

- 5.1. Data Interpretation
- 5.2. Tables
- 5.3. Column Graphs
- 5.4. Bar Graphs
- 5.5. Line Charts

5.6. Pie Chart

3.7. Venn Diagrams.

Reference books:

1. A Modern Approach To Verbal & Non Verbal Reasoning By R S Agarwal
2. Analytical and Logical reasoning By Sijwali B S
3. Quantitative aptitude for Competitive examination By R S Agarwal

Course Code: **NCOM107T**

Section: JOC-I

Course Title: **Presentation Skill**

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: Learn and apply, through different individual and group activities, different ideas, and skills to communicate in a positive and impressive manner. Apply the goal setting process (based on SWOT) and Q2 organizing for effective time management.

Unit-I: : Communication Skills (10 periods)

Communication Skills: The Communication Process, Elements of Interpersonal Communication, Non-Verbal Communication: Body Language, Posture, Eye Contact, Smile, Tone of Voice, Barriers to Communication. Effective Listening Skills: Active Listening, Passive Listening, Asking Questions, Empathizing, Being Non-Judgmental, Being Open Minded, Mass Communication: Design of Posters, Advertisements, notices, writing formal and informal invitations

Unit-II: Presentation (10 periods)

Focus on Audience Needs, focus on the Core Message, Use Body Language and Voice, Start Strongly, Organizing Ideas& Using Visual Aids:

Unit-III: Model and Ruls (05 periods)

SPAM Model, Effective Opening and Closing Techniques, GuyKawasaki'sRule
Overcoming Stage Fear, Story Telling

Unit-IV: Group Discussion (10 periods)

Group Discussion: Understanding GD, Evaluation Criteria, Nine Essential Qualities for Success, Positive and Negative Roles, Mind Mapping, structuring Response, Methods of Generating Fresh Idea

Unit-V: Data Interpretation (10 periods)

Data Interpretation: Interpretation and analysis of data in Tables, Case lets, Line-graphs, Pie-graphs, Boxplots, Scatterplots and Data Sufficiency

References:

1. Verbal Ability & Reading Comprehension by Arun Sharma and Meenakshi Upadhyay
2. Study material for CAT, SAT, GRE, GMAT by TIME, Career Launcher and IMSetc

Curriculum of Semester –II

Course Code: NCOM201T

Section: DSC2

Course Title: **Data Structure**

Total Credits: 03

Contact Hours: 45 (Clock Hours)

Marks: 50 UA: 30 CA: 20

Periods: 45 (45 minutes each)

Objective: Describe the important computer system resources and the role of data structure in their management policies and algorithms. To understand various functions, structures.

Unit-I: Introduction to Data Structures: (05 periods)

Data Structure and Algorithms- Introduction, Data Structures, Fundamentals of DS, Operations on Data Structure.

Unit-II: Arrays and Sorting (10 periods)

Arrays – Introduction, Memory/Storage Representation of One and Two Dimensional Array,

Sorting- Definition of Sorting, Comparison of Sorting Method, Bubble Sort, Insertion Sort, Selection Sort, Merging

Unit-III: Stacks (10 periods)

Stacks- Introduction & Definition, Application of Stack, Various Representation of Stack, Operation on stack (Push and Pop) Hierarchy of Operation, Representation of Arithmetic Expression (Infix, Postfix, Prefix) Multiple Stack. Evaluation of postfix expressions and their conversions

Unit-IV: Queues (05 periods)

Queues- Introduction, Applications of Queue, Various Representations of Queue, Operation on queue. Concept of Deque, Priority Queues, Circular Queue

Linked List (05 periods)

Linked List- Introduction, Application of Linked List, and Representation of Linked List, Operation on Linked List (Inserting, Removing, Reversing, Searching, Sorting). Concept

of Double Linked List

UNIT-5: Trees- and Graph(05 periods)

Trees- Introduction, Definition of Trees, Binary Tree, Type of Binary Tree, Operation on Binary Tree, Traversal of Binary Tree, Binary Search Tree (BST),
Graphs: - Definition of Graph, Various Terminology Used in Graph, Sequential Representation of Graph,

Reference Books:

- 1) LipschutzSchaum's "Data Structure" Outline Series [TMH].ISBN-0-07-060168-2
- 2) D. Samanta, "Classical Data Structure", Prentice Hall India, ISBN: 8120318749
- 3) Dr. S.B. Kishor, "Data Structures", Das Ganu ,4th Edition, 2011, ISBN-978-81-921757-4-

Course Code: **NCOM201P**

Section: **DSE1(Lab)**

Course Title: **Lab course 1 (Lab based on Data Structure)**

Total Credits: 02

Contact Hours: 04 Hours (Week)

Marks: 50 UA: 50

- 1) To delete an element from Kthposition of Array.
- 2) To insert an element ITEM at Kth position of Array.
- 3) To insert an element Item in Sorted Array.
- 4) To implement the operation of Push, Pop and to know the status of stack.
- 5) An algorithm to check the status of stack.
- 6) To find factorial of a number using Recursion .
- 7) To find multiplication of two number using Recursion.
- 8) To simulation the game of Tower of Hanoi using recursion.
- 9) To implement the operation of insertion and deletion on Queue.

- 10) A menu driven program to implement the operation of addition, deletion, searching, traversing, reversion, sorting, counting number of nodes and at the end erasing the link list.
- 11) Implementation of stack using linked list.
- 12) Implementation of Queue using linked list.
- 13) To create binary search tree, traverse it and find number of leaves and total nodes in the Tree.
- 14) To arrange the list of number in a Sorted order using Merge Sort.
- 15) To arrange the list of number in the Sorted order using Quick sort.
- 16) To check all the element of list is in sorted order or not.
- 17) To search an element using sequential or linear search .At the end display time required to search an element including number of comparison.
- 18) To search an item position in sorted list (Binary search)

Course Code: **NCOM202T**

Section: DSC2

Course Title: **OOPs using C++**

Total Credits: 03

Contact Hours: 45 (Clock Hours)

Marks: 50 UA: 30 CA: 20

Periods: 45 (45 minutes each)

Objective: This course is designed to introduce programming concepts using C++ to students. The course aims to develop structured as well as object-oriented programming skills using C++ programming language. The course also aims to achieve competence amongst its students to develop correct and efficient C++ programs to solve problems spanning multiple domains..

Unit-I: Introduction to OOPs: (05 periods)

Object Oriented Programming, Basic concepts of OOPS, Benefits of OOPs.

Introduction to C ++

Tokens, Keywords, Identifiers, Constant, Data types, variables, Scope resolution Operator, I/O statements, Structure of C++ program, Control statements, Looping statements, Type casting, Arrays, Pointer, References, Structure and Unions.

Unit-II: Function in C++ (10 periods)

Call by reference, Return by reference, Function overloading and default arguments, Inline function, Static class members, Friend functions

Unit-III: Class & Object: (10 periods)

Define Class, Members, Object, Visibility Modes, Static members, Defining Data Members and Member Functions, Nested Classes, Local Classes, Pointer to members & Pointer to Objects, Constructors & Destructors

Unit-IV: Operator overloading (15 periods)

Overloading Unary Operators, Overloading Binary Operators, Overloading using Friend Function, Rules for Overloading.

UNIT-5: Inheritance & Polymorphism: (05 periods)

Types of Inheritance with Examples, Virtual Base Classes and Abstract Base Classes, Polymorphism, Constructor and Destructor in Derived Class, Virtual Functions and Pure Virtual Function

Reference Books:

1. Robert Lafore "Object Oriented Programming with C++"
2. E. Balagurusamy "Object Oriented Programming with C++"
3. 4. Herbert Schildt "The Complete Reference C++"
5. Yashwant Kanitkar "Let us C++"

Course Code: **NCOM202P**

Section: **DSE1(Lab)**

Course Title: **Lab course 5 (C++ Programming Lab)**

Total Credits: 02

Contact Hours: 04 Hours (Week)

Marks: 50 UA: 50

1. Demonstrate the following program

1. Demonstrate C++ programming Structure
 2. Use of data types, initialization
 3. Use of control statements
 4. Use of looping statements
 5. Demonstrate input output statements
 6. Use of array
 7. Demonstrate string library function
 8. Use of C++ programs to solve some arithmetical and logical problems
2. Creation: Project report preparation based on approval project by the department
 3. Self Evaluation: Based on checklist provided by instructor.

Course Code: **NCOM203T1**

Course Title: **Hardware Maintenance**

Section: **Minor 2**

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: To impart basic knowledge of computer hardware, components, computer number system, how the CPU works, fundamental about algorithms and flowchart as well as different type of software.

UNIT-1: Basic Information of Computer: (10 period)

Introduction and classification of computer, Functional block diagram of pc with its internal Working.

Identification of Computer Parts

Introduction of computer parts like SMPS, Motherboard, Processor, Ram, Hard disk, Optical drive, Cabinet, Keyboard, Mouse, Monitor, Add-On Cards

UNIT-2: Assembling of computer: (10 period)

Building your own pc with all parts Installation, Cable Connection and power Connections other

CMOS Setting

CMOS Setup, formatting of Hard Disk, Bios Password Stetting and Recovery

UNIT-3: Installation of Operating System: (10 period)

Windows XP, Win 7, Win 8, Win 10, Linux Ubuntu, Drivers Installation

Installation of Application Software

Installation of Application Software like MS-Office, Adobe Reader, WinRAR, VLC Player, Page Maker, Corel Draw, Marathi Font, Ism Office and Other

Virus Removal: (10 period)

Installation of Antivirus software and Activation like NPAV, Quick Hel, Updating, scanning

UNIT-4: Installation of Peripherals (10 period)

Installation of external Parts of computer like Printer, Scanner Modem Card, Web Camera and other

UNIT-5: Uses of Internet (05 period)

Online form filling Gov. Jobs (competitive exam), Uses of internet in education, Remote Desktop Connection sharing, Downloading, Uploading.

Troubleshooting

Fault Finding and Troubleshooting, Data recovery, password Recovery various type of computers problem

Reference Books

Book Title : Upgrading and Repairing PCs Author : Scott Mueller Edition : 22nd Edition
Publisher : Que

2. Book Title : Modern Computer Hardware Course Author : Lotia Manahar Publisher : B P B Publications

3. Book Title : Computer Hardware Author : Hing Lown Publisher : Independently Published (Copy Right Material of Author)

4. Book Title : Computer Hardware and Troubleshooting Lab Guide: (Understand, Repair, Upgrade and do troubleshooting your computer (PC's) yourselves) Author : G. Ganesh Shashidhar Publisher : Independently Published (Copy Right Material of Author)

Course Code: **NCOM203T2**

Course Title: **Web Designing**

Section: **Minor 2**

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: The course aims at introducing the basic concepts and techniques of client side web programming. The student shall be able to develop simple websites using HTML and CSS

UNIT-1: Introduction to Web Designing: (10 period)

Web page, Website, Web browser, www, Developing web Documents-Web design process, and Publishing documents: Web publishing. Maintaining documents: maintenance phases of web page

UNIT-2: HTML Introduction: (10 period)

HTML Markup tags: Tags-Definition, Basic Tags-HTML, HEAD, TITLE, BODY. Paragraph Tags, List tags, Horizontal Rule Tag, Headings Tags, Block quote Tags, Address Tags, FONT Tag, PRE tag, DIV tags, SPAN tag& other different formatting tags.

UNIT-3: Linking and Image tag in HTML:: (10 period)

Linking in HTML: U.R.L. concept, Hyperlink (Anchor) Tag & it's all attributes, Creating Email Hyperlinks (using mailto anchor).

Images in HTML:

Introduction: Image & image formats, tag& it's all attributes, Inline & Floating Images, Using Images as links

UNIT-4: Tables in HTML (10 period)

Tables in HTML: Introduction, Table Tags:- TABLE, TR, TH, TD & all Attributes, Row span, Cols pan, Cell spacing, Cell padding, Table examples

UNIT-5: Forms in HTML: (05 period)

Introduction to forms, FORM tag& it's attributes (Action, Enctype, Method, Name), Simple form examples, Form controls: Text Field, Password Field, Multiline Text Area, Drop, Down List, Check Box, Radio Buttons, Scrolled List, Reset Button, Submit button.

Reference Books:

1. Thommas A Powel, "The complete Reference (HTML & XHTML)", 4th Edition (Tata McGraw Hill publication.)
2. HTML completes 2nd Edition-BPB Publication

Course Code: **NCOM203T3**
Course Title: **DTP and Multimedia**
Section: Minor 2
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50 (CA: 20 UA: 30)
Periods: 45 (45 minutes each)

Objective: The primary objective of this course is

- To understand the fundamentals & concepts of DTP
- To understand the fundamentals & concepts of Adobe Photoshop
- To give the students a hands on experience on Adobe Photoshop
- To impart the knowledge in order to create animations

UNIT-1: (10 period)

Scope of the DTPO trade, Safety rules and safety signs, Types and working of fire extinguishers, Introduction to computer components, Introduction to computer system.

UNIT-2: (10 period)

Concepts of hardware and software Function of motherboard components and various processors, Various Input/ Output devices in use and their features.

UNIT-3: (10 period)

Introduction to the Word processing Software, Creating,saving and formatting and printing documents using Word,

UNIT-4: (10 period)

Working with objects, macro, mail merge, templates and other tools in Word, Merits and demerits Word Processing Softwar

UNIT-5: (05 period)

Create, format, edit and develop images using Adobe Photoshop software, Draw, edit, format and develop graphics design using Corel draw application software.

Reference Books:

1. Ramesh Bangia, "Learning Desktop Publishing(DTP) Second Edition", Khanna publishing

Course Code: **NCOM204T1**

Course Title: 8085 Microprocessor

Section: Generic Elective/ O. E-2

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: The primary objective of this course is

- To understand the fundamentals & concepts of DTP
- To understand the fundamentals & concepts of Adobe Photoshop
- To give the students a hands on experience on Adobe Photoshop
- To impart the knowledge in order to create animations

UNIT-1: (10 period)

Microprocessor, microcomputers, and Assembly Language: Microprocessor, Microprocessor Instruction Set and Computer Languages, From Large Computers to Single-Chip Microcontrollers, Applications.

Microprocessor Architecture and Microcomputer System: Microprocessor Architecture and its operation's, Memory, I/O Devices, Microcomputer System, Logic Devices and Interfacing, Microprocessor-Based System Application.

UNIT-2: (10 period)

8085 Microprocessor Architecture and Memory Interface: Introduction, 8085 Microprocessor unit, 8085-Based Microcomputer, Memory Interfacing, Interfacing the 8155 Memory Segment, Illustrative Example: Designing Memory for the MCTS Project, Testing and Troubleshooting Memory Interfacing Circuit, 8085-Based Single-Board microcomputer

UNIT-3: (10 period)

Introduction to 8085 Assembly Language Programming: The 8085 Programming Model, Instruction Classification, Instruction, Data and Storage, Writing assembling and Execution of a simple program, Overview of 8085 Instruction Set, Writing and Assembling Program

UNIT-4: (10 period)

Introduction to 8085 Instructions: Data Transfer Operations, Arithmetic Operations, Logic Operation, Branch Operation, Writing Assembly Languages Programs, Debugging a Program.

UNIT-5: (05 period)

Programming Techniques With Additional Instructions: Programming Techniques: Looping, Counting and Indexing, Additional Data Transfer and 16-Bit Arithmetic Instructions, Arithmetic Instruction Related to Memory, Logic Operations: Rotate, Logics Operations: Compare, Dynamic Debugging..

Reference Book

1. Microprocessors Architecture, Programming and Applications with the 8085 Authors
Ramesh Gaonka Publisher PENRAM Edition 5th, 2012
2. Computer System Architecture Authors M. Morris Mano Publisher PHI
Edition , 1998

Course Code: **NCOM204T2**

Course Title: **Data Visualization**

Section: Generic Elective/ O. E-2

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: The primary objective of this course is

1. Understand the various types of data, apply and evaluate the principles of data visualization.
2. Acquire skills to apply visualization techniques to a problem and its associated dataset.
3. Apply structured approach to create effective visualizations.
4. Learn how to bring valuable insight from the massive dataset using visualization.
5. Learn how to build visualization dashboard to support decision making.
6. Create interactive visualization for better insight using various visualization tools

UNIT-1: Introduction to Data Science (10 period)

Data Science: Introduction to Data Science – Digital Universe – Sources of Data – Information Commons – Data Science Project Life Cycle: OSEMN Framework.

UNIT-2: Data Preprocessing (10 period)

Introduction to Data Preprocessing – Reading, Selecting, Filtering Data – Filtering Missing Values
– Manipulating, Sorting, Grouping, Rearranging, Ranking Data

UNIT-3: Data visualization (10 period)

Data visualization: Box plot, histogram, scatter plot, heat map – Working with Tableau – Outlier detection – Data Balancing

UNIT-4: Visualization Techniques (05 period)

Scalar and Point techniques – Color maps – Contouring – Height Plots - Vector visualization techniques – Vector properties – Vector Glyphs – Vector Color Coding – Matrix visualization techniques

UNIT-4: Visualization Techniques (05 period)

Introduction to various data visualization tools: R –basics, Data preprocessing, Statistical analysis, Plotly and ggplot library, Tableau, D3.js, Gephi

Reference Book

1. Tamara Munzer, Visualization Analysis and Design, CRC Press 2014.
2. Aragues, Anthony. Visualizing Streaming Data: Interactive Analysis Beyond Static Limits. O'Reilly Media, Inc., 2018

Course Code: **NCOM204T2**

Course Title: **Computational Statistics**

Section: **Generic Elective/ O. E-2**

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: Students successfully completing this course should be able to:

1. To acquaint students with various statistical methods and their applications in different Fields.
2. To cultivate statistical thinking among students.
3. To develop skills in handling complex problems in data analysis and research design.
4. To prepare students for future courses having quantitative components

UNIT-1: Introduction to Statistics (10 period)

Introduction and basic concepts of Statistics Definition of Statistics, Scope and importance of Statistics. Primary and Secondary data, Types of data : qualitative, quantitative, discrete, continuous, cross-section, time series, failure,

industrial,directional data

UNIT-2: Graphical Representation of Data (10 period)

Graphical presentation: Histogram, frequency polygon, frequency Curves Diagrammatic presentation: Bar diagrams, Pi diagram, scatter diagram.

UNIT-3: Statistical Measure for Data (10 period)

Computation of mode, Merits and demerits of mode. Median: Computation for frequency and non-frequency data, computation. Merits & demerits of median. Geometric mean (G.M.) computation for G M ,Merits demerits and applications of G.M.Harmonic Mean (H M) computation for frequency, non-frequency data, merits, demerits

UNIT-4: Classification of Data (05 period)

Classification of data: frequency distributions, inclusive and exclusive methods of classification

UNIT-5: Probability (05 period)

Probability: basics of probability, conditional probabilities, the multiplication rule, Independence

Core References:

1. "Numerical Computational Methods" - Dr. P.B. Patil, Narosa Publication Hous.
2. Statistical Methods By S. C.Gupta and V.K. Kapoor.

Course Code: **NCOM205P1**

Section: SEC

Course Title: **Lab course 5 (Lab based on 8085 Microprocessor)**

Total Credits: 02

Contact Hours: 04 Hours (Week)

Marks: 50 UA: 50

1. Demonstrate the following program

1 Perform the following Operations related to memory locations.

a Store the data byte 32H into memory location 4000H.

b Exchange the contents of memory locations 2000H and 4000H

2 Simple assembly language programs

a Subtract the contents of memory location 4001H from the memory location 2000H and place the result in memory location 4002H

b Subtract two 8-bit numbers

Add the 16-bit number in memory locations 4000H and 4001H to the 16-bit number in memory locations 4002H and 4003H. The most significant eight bits of the two numbers to be added are in memory locations 4001H and 4003H. Store the result in memory locations 4004H and 4005H with the most significant byte in memory location 4005H.

c Add the contents of memory locations 40001H and 4001H and place the result in the memory locations 4002H and 4003H.

d Subtract the 16-bit number in memory locations 4002H and 4003H from the 16-bit number in memory locations 4000H and 4001H. The most significant eight bits of the two numbers are in memory locations 4001H and 4003H. Store the result in memory locations 4004H and 4005H with the most significant byte in memory location 4005H.

e Find the 1's complement of the number stored at memory location 4400H and store the complemented number at memory location 4300H.

f Find the 2's complement of the number stored at memory location 4200H and store the complemented number at memory location 4300H.

3 Packing and unpacking operations.

a Pack the two unpacked BCD numbers stored in memory locations 4200H and 4201H and store result in memory location 4300H. Assume the least significant digit is stored at 4200H.

Two digit BCD number is stored in memory location 4200H. Unpack the BCD number and store the two digits in memory locations 4300H and 4301H such that memory location 4300H will have lower BCD digit.

4 Register Operations.

a Write a program to shift an eight bit data four bits right. Assume that data is in register C.

b Program to shift a 16-bit data 1 bit left. Assume data is in the HL register pair

c Write a set of instructions to alter the contents of flag register in 8085.

d . Write a program to count number of 1's in the contents of D register and store the count in the B register

5 Multiple memory locations.

Calculate the sum of series of numbers. The length of the series is in memory location 4200H and the series begins from memory location 4201H. a. Consider the sum to be 8 bit number. So, ignore carries. Store the sum at memory location 4300H. b. Consider the sum to be 16 bit number. Store the sum at memory locations 4300H and 4301H

a . Multiply two 8-bit numbers stored in memory locations 2200H and 2201H by repetitive addition and store the result in memory locations 2300H and 2301H

Course Code: **NCOM205P2**

Section: SEC

Course Title: **Lab course 5 (Lab based on Data Visualization)**

Total Credits: 02

Contact Hours: 04 Hours (Week)

Marks: 50 UA: 50

1. Demonstrate the following program

- i. Study of data analysis using MS-Excel(Prerequisite)**
 - 1. Study of basic Syntaxes in R
 - 2. Implementation of vector data objects operations
 - 3. Implementation of matrix, array and factors and perform va in R
 - 4. Implementation and use of data frames in R
 - 5. Create Sample (Dummy) Data in R and perform data manipulation with R
 - 6. Study and implementation of various control structures in R
 - 7. Data Manipulation with dplyr package
 - 8. Data Manipulation with data.table package
 - 9. Study and implementation of Data Visualization with ggplot2
 - 10. Study and implementation data transpose operations in R

Course Code: **NCOM205P3**

Section: SEC

Course Title: **Lab course 5 (Lab based on Computational Statistics)**

Total Credits: 02

Contact Hours: 04 Hours (Week)

Marks: 50 UA: 50

Introduction to MATLAB Environment

Introduction, starting and ending a MATLAB session, command window, command history window, work space current directory, edit window, figure window, help feature

MATLAB Introduction:

MATLAB Introduction, help command, look for command, General commands, Directory command, Workspace command, Termination commands. Advantages of MATLAB, disadvantages of MATLAB Octave: Introduction, The help command, The disp command, Date and time command, clock command

List of Experiments

1. Demonstration of Input, Output Devices and CPU.
2. Demonstration of and Pointing and Memory Device.
3. Study of Introduction to MATLAB
4. Component's in MATLAB environment.
5. Tool boxes in MATLAB
6. Study of Windows in MATLAB
7. Study of Introduction to Scilab
8. Component's in Scilab environment.
9. Tool boxes in Scilab
10. Study of Windows in Scilab

Course Code: NCOM206T

Course Title: Digital Marketing

Section: VSC-2

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: The primary objective of this course is

- Understand the major digital marketing channels - online advertising: Digital display, video, mobile, search engine, and social media
- Learn and develop, evaluate, and execute a comprehensive digital marketing strategy and plan
- Learn how to measure digital marketing efforts and calculate ROI
- Explore the latest digital ad technologies

UNIT-1: INTRODUCTION TO DIGITAL MARKETING(10 period)

Digital marketing, Marketing v/s Sales, comparison between digital and traditional marketing, Benefits of Digital marketing, Digital marketing platforms and Strategies, Defining Marketing Goals, Latest Digital marketing trends, Case studies of Digital Campaign

UNIT-2: SEARCH ENGINE OPTIMIZATION(SEO) (10 period)

Components of Search Engines, SEO Keyword Planning, Meta Tags and Meta Description, Website Content Optimization, Back Link Strategies, Internal and External Links, Optimizing Site Structure Keywords in Blog and Articles, On Page SEO, Off Page SEO, Local SEO, Mobile SEO, Ecommerce SEO, optimizing with Google Algorithms, Using Web Master Tool, Measuring SEO Effectiveness

UNIT-3: SOCIAL MEDIA MARKETING (SMM) (10 period)

Introduction to social Media Marketing, Benefits of using SMM, Social Media Statistics, Social Media Strategy, Facebook Marketing, Word Press blog creation, Twitter marketing, LinkedIn Marketing, Google plus marketing, Social Media Analytical Tools

UNIT-4: SEARCH ENGINE MARKETING (SEM) (10 period)

Hough transforms and other simple object recognition methods, shape correspondence and shape matching, Principal component analysis, Shape priors for recognition. Image Understanding- Pattern recognition methods- HMM, GMM and EM

UNIT-5: APPLICATION(05 period)

Google Analytics, Online Reputation Management, E-Mail Marketing, Affiliate Marketing, Social Media Analytics, Ad designing

References Book

1. Ryan Deiss and Russ Hennesberry, "Digital Marketing forDummies",2017
2. Puneet singh bhatia, "Fundamentals of DigitalMarketing",2017

Course Code: **NCOM207T**

Course Title: **Personality Development and Interview Techniques**

Section: **VOC-1**

Total Credits: 02

Contact Hours: 30 (Clock Hours)

Marks: 50 (CA: 20 UA: 30)

Periods: 45 (45 minutes each)

Objective: The primary objective of this course is

- The programme aims at grooming the participants through sensitizing them about proper behaviour, socially and professionally, in formal and informal circumstances.
- The main objective of the programme is
 - To build self-confidence
 - To build enhance self-esteem
 - To improve overall personality of the participants

UNIT-1: Introduction (10 period)

Introducing the connect with work programme

What is in it for me? Understanding the objective of the CWW programme

UNIT-2: Interview Skills (SEO) (10 period)

Interview Skills :Online Image Building a strong impression online and sustaining online credibility

Self-Awareness :To Know your personality through an MBTI ,Grooming To study corporate grooming habits (The right attire) ,

Body Language :To imbibe the right body language for a professional environment

Confidence: To increase self-belief and faith in one's own abilities Interview FAQs
Learn to face frequently asked interview questions

Resume: To build a strong profiles through effective resume writing

Rejections:To understand how to handle interview rejections and come back from set-backs

UNIT-3: Corporate Readiness (10 period)

Corporate Readiness

Values: An introduction to values in a corporate environment

Ownership: To learn how to be accountable and own tasks, projects etc.

Respect: To understand the importance of respect as a critical corporate value

Teamwork: To understand collaboration and its importance in the corporate world

Autodidacticism: To leverage self-learning and self-directed education

Flexibility: To learn how to be flexible while playing multiple roles

Time Management: To improve effectiveness at work and achieve a balance

Stress Management: To understand how stress can be managed and to lower depression

Positive Attitude: To take the step towards positive success by adapting the right approach

LinkedIn (Profile Management): To gain knowledge on LinkedIn account management and tips to enhance a profile

SWOT Analysis: To Self evaluate and analyze strengths and areas of improvement

UNIT-4: Group Discussions (10 period)

Group Discussions: Group Discussion rules and enhance Public Speaking skills (Group Discussion)

Demo session of group discussion.

UNIT-5: Mock Interviews (05 period)

Mock Interviews: Tips to handle Interviews and be able to create the right impression (Mock Interviews)

Demo session of mock interview.

Reference Books

- 1."Personality Development and Soft Skills" by Barun Mitra
- 2."Personality Development" by Swami Vivekananda
- 3."The Power of your Subconscious Mind" by Joseph Murphy
- 4."50 Mantra's of Personality Development" by Aarti Gurav
- 5."Personality Development for Students" by Dr Vijay Agrawal