DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, CHHATRAPATI SAMBHAJINAGAR.

CIRCULAR NO.SU/Revised B.Sc./NEP/72/2024

It is hereby inform to all concerned that, the Revised syllabi prepared by the Board of Studies/Ad-hoc Boards and recommended by the Dean, Faculty of Science & Technology, **Academic Council at its meeting held on 08 April 2024 has accepted** the following **Revised syllabi of Bachelor of Science** under the Faculty of Science & Technology **as per Norms of National Education Policy-2020 and as per Government Letter dated 13 March 2024** run at the Affiliated Colleges, Dr.Babasaheb Ambedkar Marathwada University as appended herewith.

Sr.No.	Courses	Semester
1.	B.Sc.Botany	Ist and IInd semester
2.	B.Sc.Biotechnology	Ist and IInd semester
3.	B.Sc.Zoology	Ist and IInd semester
4.	B.Sc.Agrochemical and Fertilizer	Ist and IInd semester
5.	B.Sc.Geology	Ist and IInd semester
6.	B.Sc.Environmental Science	Ist and IInd semester
7.	B.Sc.Home Science	Ist and IInd semester
8.	B.Sc.Diary Science and Technology	Ist and IInd semester
9.	B.Sc.Automobile Technology	Ist and IInd semester
10.	B.Sc.Physics	Ist and IInd semester
11.	B.Sc.Chemistry	Ist and IInd semester
12.	B.Sc.Analytical Chemistry	Ist and IInd semester
13.	B.Sc.Polymer Chemistry	Ist and IInd semester
14.	B.Sc.Electronics	Ist and IInd semester
15.	B.Sc.Forensic Science & Cyber Security	Ist and IInd semester
16.	B.Sc.Microbiology	Ist and IInd semester
17.	B.Sc.Fisheries Science	Ist and IInd semester
18.	B.Sc.Mathematics	Ist and IInd semester
19.	B.Sc.Forensic Science	Ist and IInd semester
20.	B.Sc.Information Technology	Ist and IInd semester
21.	B.Sc.Horticulture	Ist and IInd semester
22.	B.Sc.Networking & Multimedia	Ist and IInd semester
23.	B.Sc.Biochemistry	Ist and IInd semester
24.	B.Sc.Industrial Chemistry	Ist and IInd semester
25.	B.Sc.Bioinformatics	Ist and IInd semester

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26.	B.Sc.Instrumentation Practice	Ist and IInd semester
27.	B.Sc.Non-Conventional and Conventional Energy	Ist and IInd semester
28.	B.Sc.Statistics	Ist and IInd semester
29.	Bachelor of Computer Application	
30.	B.Sc.Computer Science (Degree)	Ist and IInd semester
31.	B.Sc.Computer Science (Optional)	Ist and IInd semester

This is effective from the Academic Year 2024-25 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,
Aurangabad-431 004.
REF.NO.SU/2024/25588-96
Date:- 29.04.2024.

**Deputy Registrar,
Academic Section**

Copy forwarded with compliments to :-

1] **The Principal of all concerned Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,
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.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.
2] The Section Officer,[B.Sc.Unit] Examination Branch, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.
3] The Programmer [Computer Unit-1] Examinations, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.
4] The Programmer [Computer Unit-2] Examinations, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.
5] The In-charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.
6] The Public Relation Officer, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.
7] The Record Keeper, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

Dr. Babasaheb Ambedkar Marathwada University,

Chhatrapati Sambhajinagar- 431001

B.Sc. Degree Programme

(Three Year / Four Years (Hons) /Four Years (Hons with Research)

Course Structure and Syllabus for B. Sc. First Year

(Revised)

(AS PER NEP-2020)

Subject: B.Sc. Computer Science

3 / 4 Year Degree Course

Effective from 2024-25

PREFACE

As we stand on the threshold of a new era in education, the dawn of the National Education Policy 2020 illuminates our path toward a holistic, inclusive, and progressive educational landscape. The Bachelor of Science (B. Sc.) curriculum outlined herein reflects the ethos and aspirations of this transformative policy, aiming to equip learners with the knowledge, skills, and values necessary to thrive in the dynamic world of the 21st century.

At its core, the National Education Policy 2020 envisions an educational framework that is learner-centric, multidisciplinary, and geared towards fostering creativity, critical thinking, and innovation. It emphasizes the integration of knowledge across disciplines, breaking down traditional silos to encourage holistic understanding and application of concepts. The Bachelor of Science (B. Sc.) curriculum embodies these principles by offering a diverse array of courses spanning various scientific domains, while also incorporating interdisciplinary studies to nurture well-rounded graduates capable of addressing complex challenges with agility and insight.

Furthermore, the curriculum is designed to promote experiential learning, research, and hands-on exploration, recognizing the importance of practical engagement in deepening understanding and cultivating real-world skills. Through laboratory work, field experiences, internships, and project-based learning opportunities, students will have the chance to apply theoretical knowledge in practical settings, develop problem-solving abilities, and cultivate a spirit of inquiry and discovery.

Integral to the National Education Policy 2020 is the commitment to inclusivity, equity, and access to quality education for all. The Bachelor of Science (B. Sc.) curriculum reflects this commitment by embracing diversity in perspectives, backgrounds, and experiences, and by fostering an inclusive learning environment where every student feels valued, supported, and empowered to succeed.

Moreover, the curriculum emphasizes the cultivation of ethical values, social responsibility, and global citizenship, instilling in students a sense of accountability towards society and the environment. By integrating courses on ethics, sustainability, and social sciences, the Bachelor of Science (B. Sc.) program aims to produce graduates who are not only proficient in their respective fields but also compassionate, ethical leaders committed to making a positive impact on the world.

As we embark on this journey of educational transformation guided by the National Education Policy 2020, the Bachelor of Science (B. Sc.) curriculum stands as a testament to our collective vision of a more equitable, inclusive, and enlightened society. It is our hope that through rigorous academics, innovative pedagogy, and unwavering dedication to excellence, we can inspire the next generation of scientists, scholars, and change-makers to realize their full potential and contribute meaningfully to the advancement of knowledge and the betterment of humanity.

Students will have to choose any three subjects as a **Major 1, Major 2, Major 3,** from Basket 1 under the Faculty of Science and Technology.

Students will be having three subject options of equal credits (instead of Major and / or minor verticals) in the first year. Students will have to select / declare choice of one subject **as a major subject** in the beginning of second year **out of three major options M1, M2 and M3 (which were opted in the first year).**

Detailed Illustration of Courses included in 1st and 2nd semester:

1) **Major** (Core) subject are mandatory.

   DSC-1 : This is a 2 credit theory course corresponding to Major (core) subject
   DSC-2 : This is a 2 credit practical course based on DSC-1
   DSC-3 : This is a 2 credit theory course corresponding to Major (core) subject
   DSC-4 : This is a 2 credit practical course based on DSC-3

2) **Generic / Open Elective (GE/OE):** (Needs to be chosen (any two) from pool of courses available at respective college). **These courses should be chosen compulsorily from faculty other than that of Major.**

   GE/OE -1 : This is a 2 credit theory course should be chosen compulsorily from faculty other than that of Major.
   GE/OE -2 : This is a 2 credit theory course should be chosen compulsorily from faculty other than that of Major.

3) **SEC** (Skill Enhancement Courses) : Choose any one from pool of courses. These courses needs to be designed to enhance the technical skills of the students in specific area.

   SEC-1 : This is a 1 credit theory course to enhance the technical skills of the students in specific area.
   SEC-2 : This is a 1 credit practical course based on SEC-1.

4) **VSC** (Vocational Skill Courses) : Choose any one from pool of courses. These courses should be based on Hands on Training corresponding to Major (core) subject.

   VSC-1 : This is a 1 credit theory course based Hands on Training corresponding to Major (core) subject.
   VSC-2 : This is a 1 credit practical course based on VSC-1

5) **AEC** (Ability Enhancement courses): The focus of these courses should be based on linguistic and communication skills.

   AEC-1 : English
   This is a 2 credit theory course based on linguistic proficiency. It will be common for all the faculty.

   AEC-2 : English

This is a 2 credit theory course based on linguistic proficiency. It will be common for all the faculty.

6) **IKS** (Indian Knowledge System) : The courses related to traditional and ancient culture of India will be included in this section. The respective college will have to choose one of the courses from the pool of courses designed by the University.

IKS-1 : To be chosen from the pool of courses designed by the University
This is a 2 credit theory course based on Indian Knowledge System. It will be common for all the faculty

7) **VEC** (Value Education Courses): The courses such as understanding India, Environmental Science / Education, Digital and Technological solutions etc will be part of Value Education Courses.

VEC-1 : Constitution of India
This is a 2 credit theory course based on value education. It will be common for all the faculty

8) **CC** (Curricular Courses): The courses such as Health and wellness, Yoga education, Sports and Fitness, Cultural activities, NSS/NCC, Preforming Arts.

CC-1 : Health and Wellness
This is a 2 credit practical course based on Co-curricular activities. It will be common for all the faculty

CC-2 : Yoga education / Sports and Fitness
This is a 2 credit practical course based on Co-curricular activities. It will be common for all the faculty

Structure of B. Sc. (Three / Four Years Honours / Honours with Research Degree) Programme with Multiple Entry and Exit Options

Subject : B.Sc. (Computer science)

BSc First Year: 1st Semester

Course Type	Course Code	Course Name	Teaching Scheme (Hrs / Week)		Credits Assigned		Total Credits
			Theory	Practical	Theory	Practical	
Major (Core) M1 Mandatory	DSC-1	Programming in C	2		2		2+2 = 4
	DSC-2	Practical based on DSC-1		4		2	
Major (Core) M2 Mandatory	DSC-3	DBMS	2		2		2+2 = 4
	DSC-4	Practical based on DSC-3		4		2	
Major (Core) M3 Mandatory	DSC-5	Operating System	2		2		2+2 = 4
	DSC-6	Practical based on DSC-5		4		2	
Generic / Open Elective (GE/OE) (Choose any two from pool of courses) **It should be chosen compulsorily from the faculty other than that of Major**	GE/OE-1	To be chosen from other faculty	2		2		2
SEC (Skill Enhancement Courses) (Choose any one from pool of courses)	SEC-1	A) HTML and CSS B)PC Maintenance	1		1		2
	SEC-2	Practical's based on SEC-1A OR Practical's based on SEC-1B		2		1	
AEC, VEC, IKS	AEC-1	English (Common for all the faculty)	2		2		2+2 =4
	IKS-1	Choose any one from pool of courses	2		2		
OJT/ FP/CEP/CC/RP	CC-1	Health and Wellness (Common for all the faculty)		4		2	2
			13	18	13	09	22

GE/OE-1: Cyber Security (This Course will be available for the students from other faculty)

BSc First Year: 2nd Semester

Course Type	Course Code	Course Name	Teaching Scheme (Hrs / Week)		Credits Assigned		Total Credits
			Theory	Practical	Theory	Practical	
Major (Core) M1 Mandatory	DSC-7	Programming in C++	2		2		2+2 = 4
	DSC-8	Practical based on DSC-7		4		2	
Major (Core) M2 Mandatory	DSC-9	Advanced DBMS	2		2		2+2 = 4
	DSC-10	Practical based on DSC-9		4		2	
Major (Core) M3 Mandatory	DSC-11	Linux Operating System	2		2		2+2 = 4
	DSC-12	Practical based on DSC-11		4		2	
Generic / Open Elective (GE/OE) (Choose any two from pool of courses) **It should be chosen compulsorily from the faculty other than that of Major**	GE/OE-2	To be chosen from other faculty	2		2		2
VSC (Vocational Skill Courses) (Choose any one from pool of courses)	VSC-1	A) JavaScript B) Basics of Networking	1		1		2
	VSC-2	Practical's based on VSC-1A OR Practical's based on VSC-1B		2		1	
AEC, VEC, IKS	AEC-1	English (Common for all the faculty)	2		2		2+2 =4
	VEC-1	Constitution of India (Common for all the faculty)	2		2		
OJT/ FP/CEP/CC/RP	CC-2	Yoga Education / Sports and Fitness (Common for all the faculty)		4		2	2
			13	18	13	09	22

Exit Option : Award of UG Certificate in 3 Majors with 44 credits and an additional 4 credits of core NSQF course / Internship OR continue with Major and Minor

GE/OE-2: E-Commerce and E-Contracts (This Course will be available for the students from other faculty)

Programme Educational Objectives (PEOs) :

Programme Educational Objectives (PEOs) for the Bachelor of Science Curriculum under the National Education Policy 2020:

1. **Mastery of Discipline-Specific Knowledge:** Graduates of the Bachelor of Science program will demonstrate a deep understanding of fundamental principles, theories, and methodologies in their chosen scientific discipline, enabling them to analyze complex problems, propose innovative solutions, and contribute to advancements in their field.

2. **Interdisciplinary Proficiency:** Graduates will possess the ability to integrate knowledge and skills from multiple scientific disciplines, fostering a holistic approach to problem-solving and innovation. They will be equipped to address multifaceted challenges by drawing upon diverse perspectives and methodologies.

3. **Critical Thinking and Analytical Skills:** Graduates will develop strong critical thinking abilities, enabling them to evaluate information rigorously, analyze data effectively, and make informed decisions based on evidence. They will demonstrate proficiency in applying logical reasoning and scientific methods to solve problems and generate new knowledge.

4. **Leadership and Innovation:** Graduates will demonstrate leadership qualities and entrepreneurial mindset, capable of initiating and driving positive change in their organizations and communities. They will exhibit creativity, resilience, and adaptability, harnessing innovation to address complex challenges and seize opportunities for growth and advancement.

5. **Global Citizenship and Cultural Sensitivity:** Graduates will possess a global perspective and cultural sensitivity, recognizing the interconnectedness of diverse communities and the importance of collaboration across borders. They will engage in cross-cultural dialogue, embrace diversity, and contribute to the advancement of knowledge and understanding on a global scale.

These Programme Educational Objectives serve as guiding principles for the Bachelor of Science curriculum, reflecting our commitment to nurturing well-rounded graduates who are prepared to excel in their careers, contribute to society, and lead meaningful lives in a rapidly changing world.

Programme Outcomes (POs) :

The National Education Policy (NEP) 2020 for India emphasizes several key aspects for Bachelor of Science (B.Sc.) programs, aiming to produce graduates who are not only well-versed in their respective disciplines but also equipped with skills necessary for holistic development and employability. While specific program outcomes may vary between institutions and disciplines within B.Sc. programs, here are some common outcomes aligned with NEP 2020:

> **PO1.** To develop problem solving abilities using a computer.

> **PO2.** To prepare necessary knowledge base for research and development in Computer Science.

> **PO3. Ethics:** Apply ability to develop sustainable practical solutions for science subject related problems within positive professional and ethical boundaries.

> **PO4. Individual and team work:** Function effectively as a leader and as well as team member in diverse/ multidisciplinary environments.

> **PO5. Communication:** Communicate effectively on complex science subject related activities with the scientific community in particular and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

> **PO6. Project management**: Demonstrate knowledge and understanding of the first principles of science and apply these to one's own work as a member and leader in a team, to complete project in any environment.

> **PO7. Life-long learning**: Recognize the need for lifelong learning and have the ability to engage in independent and life-long learning in the broadest context of technological change

> **PO8.** To train students in professional skills related to Software Industry

These program outcomes align with the broader goals of NEP 2020 to transform higher education in India and prepare students for the challenges and opportunities of the 21st century. Board of Studies designing B.Sc. curricula are encouraged to incorporate these outcomes into their program objectives and learning outcomes.

Programme Specific Outcomes (PSOs):

PSO1. **Domain knowledge:** Apply the knowledge of Computer Science fundamental, and advanced areas of Computer Science to provide comprehensive solution

PSO2. **Problem Analysis:** Identify Computer Science related problems at varied complexity and analyze the same to formulate/ develop substantiated conclusion

PSO3. **Design Development of solutions:** Design/ develop solutions for problems at varied complexity in various areas of Computer Science to address changing challenges put forward by market demand/ stakeholder

PSO4. **Conduct Investigation of complex problems:** Use established knowledge and methods to design of experiments, analyze resulting data and interpret the same to provide valid conclusions.

PSO5. **Modern tools:** Create, select, and apply appropriate techniques, resources, and modern electronics and relevant IT tools including prediction and modeling to complex Information Technology related activities with clear understanding of the limitations.

Semester- I

M1-DSC-1 : Programming in C

Total Credits : 02	Total Contact Hours : 30 Hrs
Maximum Marks : 50	

Learning Objectives of the Course:

     i)   To learn basic features
     ii) To learn different decision making and looping statements
     iii) To understand the concepts of array
     iv) To learn modular applications in C using functions
     v)   To understand concepts of pointers and structures

Course Outcomes (COs) :

After completion of the course, students will be able to –

     i)   Implement basic C programs
     ii) Develop and implement conditional and iterative statements
     iii) Implement different types of arrays
     iv) Develop and implement modular applications in C using functions
     v)   Implement structure and pointers

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	**Introduction-** History of C language, Features, Character set, C Token, Identifier & Keywords, Variables, Constant & its types, various Operators, **Data Types -** int, char, float, double.	**10 Hrs**
II	**Structure of C Program -** I/O statements, Compilation & Execution of C program in Geany IDE C compiler /Turbo c compiler, Escape sequence characters, Decision making and looping Statements, ? : Operator, Loop interruption statements.	**10 Hrs**
III	**Arrays -** Introduction, Declaration & initialization, Accessing array elements, Types of arrays, **Function -** Introduction, defining function, Arguments, Function prototype, function calling & Returning value from function, Call by Value & Call by Reference, Recursion **Pointers -**Introduction, address (&) and indirection (*) Operators, Declaration and initialization of pointers, **Structure-** Introduction, Declaration & initializing structure, Accessing structure members, Nested structures.	**10 Hrs**

Reference Books:

1 Let us C : Y.P. Kanetkar [bpb publication]

2 Programming in C : E. Balagurusamy [Tata macgraw hill]

3 Spirit of "C" : Mullish Cooper
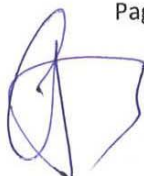
M1-DSC-2: Practical based on DSC-1 (Programming in C)

Total Credits : 02	Total Contact Hours : 60 Hrs

Maximum Marks : 50

Sample List of experiments to be carried out based on the course DSC-1.
Execute the programs on Turbo C compiler/ Geany IDE, etc.

1	Program to find average of three numbers
2	Program to find area of circle
3	Program to Find largest number from two numbers
4	Program to check entered number is positive, negative or zero
5	Program to demonstrate switch case statement
6	Program to print odd numbers from 1 to N
7	Program to demonstrate nested loop
8	Program to check entered number is even or odd
9	Program to print the Fibonacci Series
10	Program to demonstrate one dimensional array
11	Program to demonstrate two dimensional array
12	Program to find factorial of given number using function
13	Program for Swapping of numbers by using call by reference
14	Program to create structure student
15	Program to demonstrate pointers

M2: DSC-3 : Database Management System (DBMS)

Total Credits: 02   Total Contact Hours : 30 Hrs
Maximum Marks: 50

Learning Objectives of the Course:
   i)   To understand the fundamental concepts of database
   ii) To understand user requirements and frame it in data model.
   iii) To understand creations, manipulation and querying of data in databases.

Course Outcomes (COs) :

After completion of the course, students will be able to -
   i)   Design data models, schemas and instances
   ii) Design E-R Model for given requirements and convert the same into database
        tables.
   iii) Implement SQL: Data definition, constraints, schema, queries and operations
        inSQL

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	Introduction, Levels of abstraction & data independence, Structure of DBMS, Users of DBMS, Advantages of DBMS, design process, Introduction to data models: E-R model, Relational model, Networkmodel, Hierarchical model Constraints : Key constraints, Integrity constraints, referential integrity, unique constraint, Null/Not Null constraint, Domain, Check constraint	10 Hrs
II	Overview of Database: Extended features – Specialization, Aggregation, Generalization, Introduction to query languages, Basic structure, DDL Commands, DML Commands, Forms of a basic SQL query (Expression and strings in SQL) Set operations, Aggregate Operators and functions, Date and String functions, Null values, Nested Sub queries SQL mechanisms for joining relations (inner joins, outer joins and their types), Views	10 Hrs
II	Introduction to Relational-Database Design, undesirable properties of an RDBdesign, Functional Dependency, Lossless join, Lossy join, Dependency Preservation Normalization, Normal Forms-1NF,2NF ,3NF and BCNF	10 Hrs

Reference Books:

1. Abraham Silberschatz, Henry F Korth, S Sudarshan, Database System Concepts, McGraw-Hill, 6th Edition, 2010

2. Ramakrishnan, Gehrke, Database Management Systems, McGraw-Hill, 3rd Edition, 2003

3. Elmasri, Navathe, Somayajulu, Fundamentals of Database Systems, Pearson Education, 4th Edition, 2004.

M2: DSC-4 : Practical based on DSC-3 (DBMS)

Total Credits : 02   Total Contact Hours : 60 Hrs
Maximum Marks : 50

List of practical to be conducted in Laboratories –

1   To create simple tables with only the primary key constraint
    (as a tablelevel constraint & as a field level constraint) (include all data types).
2   To create more than one table make referential integrity using foreign key and
    primary key constraint.
3   To create one or more tables with following constraints, in addition to the first two
    constraints (PK & FK)
        a.   Check constraint
        b.   Unique constraint
        c.   Not null constraint
4   To drop a table, alter schema of a table on table already created in previous
    Assignments.
5   insert / update / delete records using tables (use simple forms of insert / update / delete
    statements)
6   To query the tables using simple form of select statement Select <field- list> from
    table [where <condition> order by <field list>] Select <field-list, aggregate functions
    > from table [where <condition> group by <> having <> order by <>]
7   To query tables using nested queries
8   Sort the records using order by command(ascending and descending order)
9   To write a queries using aggregate functions (MAX, MIN, SUM, COUNT, MOD,
    AVG)
10 To create views.

M3 - DSC-5 : Operating System

Total Credits : 02   Total Contact Hours : 30 Hrs
Maximum Marks : 50

Learning Objectives of the Course:

    i)   To introduce students basic functioning of operating system.
    ii)   Explore core principles and concepts of operating systems.
    iii) Explore concept of process and memory management.
    iv) Explore concept of device management.
    v)   Explore concept of CPU scheduling.

Course Outcomes (COs) :
After completion of the course, students will be able to –

    i)   Gain a comprehensive understanding of the distinction between system software and application software.
    ii)   Grasp the diverse types of operating systems, their fundamental functions, and the evolutionary progression of OS, encapsulating advancements in functionality and compatibility over time.
    iii) Gain insight into the concept of processes, process control blocks.
    iv) Understand CPU Scheduling.
    v)   Understand device management.

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	Introduction to Operating System. Operating System, Definition, classification of software, Functions of Operating System. Operating system as main component of system software, structure of OS, operating system as resource manager, types of OS-single and multiuser OS, various names of OS	10 Hrs
II	Process and memory Management: Process management- Concept of Process: Process State, Operation on Processes. File Management- Implementation of file system, disk Allocation methods- Contiguous, linked, indexed allocation Memory Management- concept, single contiguous memory management, relocatable partition memory management, fixed partition memory management, Fragmentation: Internal fragmentation, external fragmentation Page segmentation policies- concept, demand paging, page fault page replacement algorithm- Optimal, First-im-First-out, LRU approximation.	10 Hrs
III	CPU Scheduling and Device management: Introduction, Dedicated, Shared & Virtual Device, I/O devices, Storage devices, Device allocations, I/O Scheduler,	10 Hrs

| | Types of Schedulers, Criteria for scheduling, Scheduling Algorithms- (FCFS), SJF, Round Robin scheduling, priority scheduling, Concept of Deadlock. | |

Reference Books:

1. G. Nutt, Operating System, Modern Operating System Concepts, 8th edition, John Wiley Publications 2008

2. Operating System", By S.R.Sathe & Anil S.Mokhade , MacMillan Publication.

3. Operating System", By Stuart E.Madnick, John J.Donovan.

4. Operating System Concepts- A. Silberzchaz & P.B. Galvin, Addison – Wesley Publishing Company

M3 - DSC-6 : Practical based on DSC-5 (Operating System)

Total Credits : 02

Total Contact Hours : 60 Hrs

Maximum Marks : 50

1	DOS Commands
2	Demonstrate Multitasking operating System Feature
3	System Protection in Operating System
4	Difference between Application Software and System Software
5	Segmentation in Operating System
6	Write a Program to implement scheduling algorithm FCFS.
7	Write a Program to accept list of process arrival time and display Gantt chart for FCFS.
8	Write a Program to implement scheduling algorithm SJF.
9	Write a Program to implement scheduling algorithm Round Robin.
10	Write a Program to implement scheduling algorithm Priority scheduling.

SEC-1 - A): HTML and CSS

Total Credits: 01

Total Contact Hours: 15 Hrs

Maximum Marks : 50

Learning Objectives of the Course:

i)   Understanding basics of web browsers and its types.
ii) Comprehend the foundational structure of HTML documents, encompassing elements, tags, attributes, and their interconnections.
iii) Understand the basics concept and principles of web technologies.
iv) Gain practical skills in styling web site using CSS.

Course Outcomes (COs) :
After completion of the course, students will be able to –

i)   Understand fundamentals of web technologies.
ii)   Construct visually appealing static web page.
iii) Understand linking in web page.
iv)   Understand basics of forms.
v)   Use CSS for enhanced presentation and user experience.

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	Introduction to HTML: Overview of HTML, definition, HTML document object model (HTML DOM), Learn HTML Using Notepad. Introduction HTML elements and attributes. **HTML headings and paragraphs:** Basics of HTML heading, understanding use of \<h1\> to \<h6\>tags , introduction to \<p\> tag. Attributes of each tag. **HTML text formatting and quotation tags:** HTML \<b\>, \<i\>, \<u\>, \<em\>, \<strong\>, \<sub\>, \<sup\>, \<mark\>, \<del\>, tags. Understanding the use of blockquote\>,\<q\>, \<abbr\>, \<address\>, \<cite\>, and \<bdo\> tags.	05 Hrs
II	**HTML images and links:** use of images, image file formats: jpg, png, bmp, and use of image tags, and its attributes. Introduction to anchor tag and its attributes. Introduction to \<link\> tag and its attributes. **Introduction to HTML list tags, tables and forms:** ordered list, unordered list, definition list, introduction to \<table\> tags, \<th\>, \<tr\>, and \<td\> tags and its attributes. Introduction to form tag and its attributes, GET and POST methods, \<input\> tag and its attributes. Introduction to \<button\> tag.	05 Hrs

III	**Introduction to Cascading Style Sheet:** Definition of CSS. Purpose of CSS, syntax and structure of CSS. CSS types: Inline CSS, style as attribute, style as tag Internal CSS, External CSS. Basic selectors: element, class and Id selector Universal and attribute selectors Grouping and chaining selectors Advanced selectors and combinators: :hover, :active, :vistied Understand CSS box Model (content, padding, border, margin) Setting padding, border, margin property	**05 Hrs**

Reference Books:

1 WEB TECHNOLOGIES 2010 by Uttam K.
2 "Responsive Web Design with HTML5 and CSS" by Ben Frain

3. HTML and CSS: Design and Build Websites by John Duckett.
4 "Web development and Design Foundations with HTML5" by Terry Felke-Morris

SEC-1 B): P.C. Maintenance

Total Credits: 01   Total Contact Hours : 15Hrs
Maximum Marks: 50

Learning Objectives of the Course:

    i)   The student will assemble computer systems;
    ii)   Setup and upgrade personal computer systems;
    iii) Diagnose and isolate faulty components;
    iv) Optimize system performance and install / connect peripherals.

Course Outcomes (COs) :

After completion of the course, students will be able to -

    i)   Understanding of computer hardware components and peripheral devices
    ii)   Identify and troubleshoot common hardware issues
    iii) Perform routine maintenance tasks to ensure optimal performance
    iv) Install, configure, and update operating systems, drivers, and software applications to maintain system stability and security
    v)   Assembling and disassembling computer systems

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	The Four Main Functions of Computing. PC Hardware Components. PC Workspaces and Tools, Environmental and Safety Concerns. SMPS and its Types	05 Hrs
II	Motherboards and Central Processing Units, Types of Motherboards, Motherboard Form Factors, Mother Board Components : Central Processing Unit (CPU) and Processor Socket or Slot, Motherboard Buses, Chipsets, Expansion Slots, Memory Slots, Connectors	05 Hrs
III	Types of Peripheral Devices, Device Drivers, Types of RAMs (DDR2, DDR4,..), Types of Hard Drives (HDD, SSD,..) Graphics Cards: Introduction, working and types. Operating System Installation. Antivirus types.	05 Hrs

Reference Books:

1. Wiley Pathways PC Hardware Essentials Project Manual by Groth, David ; Gilster, Ron, Liberty Lake, Washington ; Polo, Russel

2. Troubleshooting, Maintaining & Repairing PCs by Stephen J. Bigelow, Tata McGraw-Hill.

3. The Complete PC Upgrade and Maintenance Guide by Mark Minasi, BPB Publication

SEC-2A: Practical based on SEC-1A (HTML & CSS)

Total Credits : 01   Total Contact Hours : 30 Hrs
Maximum Marks : 50

1	Write a HTML program to demonstrate the use of Heading tags.
2	Write a HTML program to demonstrate the use of Heading tags.
3	Write a HTML program to demonstrate the use of text formatting tags.
4	Write a HTML program to demonstrate use of list tags and its attributes.
5	Write a HTML program to demonstrate use of anchor tag.
6	Write a HTML program to demonstrate the use of table tags and its attributes.
7	Write a HTML program to demonstrate the use of form tags and its attributes.
8	Write a HTML program to demonstrate the use of internal CSS.
9	Write a HTML program to demonstrate the use external CSS.
10	Write a HTML program to demonstrate the use of inline CSS.

SEC-2B: Practical's based on SEC-1B (P.C. Maintenance)

Total Credits: 01

Total Contact Hours : 30Hrs

Maximum Marks: 50

List of practical to be conducted in Laboratories: -

1) Identification of the various components inside the PC Cabinet.
2) Practical to perform different Preventive Maintenance done for a Desktop PC
3) Practical to understand working of SMPS and trouble shooting of SMPS
4) Motherboard fitting in Cabinet, Fitting processor, RAM and other cards, Mounting and dismounting of CMOS Battery.
5) Fitting SMPS Disk Drives, making its connections on motherboard.
6) Entering into BIOS and exploring its various options. Setting Boot Priorities, enabling network booting.
7) Installation of Operating system Windows/Linux
8) Connecting various Peripherals to Computer and installing their drivers.
9) Installation of Antivirus, updating it, making different settings
10) Network settings: putting PC on DHCP, setting static IP, configuring internet gateway for multiple internet connections, , connection to Wi-Fi network.
11) Creating users and giving rights to it. Sharing of resources like printer, folders and giving access rights.
12) Performing PC maintenance activity like Disk cleanup, disk defragmentation, disk configuration etc.
13) Connecting PC to Projector and making its settings.
14) Assembly and Disassembly of Battery, CD/DVD, RAM, HDD etc. of Laptop

This course will be available for the students from other faculty

GE/OE-1: Cyber Security

Total Credits: 02   Total Contact Hours: 30 Hrs
Maximum Marks : 50

Learning Objectives of the Course:
1. Make the student will understand Cyber Security, Data Privacy and Data Protection.
2. Students will acquainted with the Types of Security threats.
3. Make the student will understand Ethical Hacking, Email security: web authentication.

Course Outcomes (COs) :
After completion of the course, students will be able to –
1. Understands the concept and process of cyber security.
2. Understands the Online Dispute Resolution.
3. Knows the Network & Mobile Security Techniques

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	Cyber Security: Meaning and Scope Computer & Cyber Security: Types of Attacks, Types of Security threats, Hacking Techniques	15 Hrs
II	Database Security; Operating System Security 2. Advance Computers, Network & Mobile Security Techniques 3. Security issues: debit cards, credit cards, ATM, Secure Electronic Transactions	15 Hrs

Reference Books:
1. Information Security and Cyber Laws, by Pankaj Sharma. S.K. Kataria & Sons
2. Fundamentals of Cyber Security, by Bhushan, Rathore, Jamshed, BPB
3. Cyber-security for Beginners, by Raef Meeuwisse. Cyber Simplicity Ltd
4. A Handbook of E-commerce, by Nidhi Dhawan, Sun India Publications
5. E-Commerce in India: Economic and Legal Perspectives, Pralok Gupta, Sage Publications India Pvt. Ltd.

Semester- II

	M1-DSC-7 : Programming in C++	
Total Credits : 02		Total Contact Hours : 30 Hrs
Maximum Marks : 50		

Learning Objectives of the Course:

    i)   Introduces Object Oriented Programming concepts using the C++ language.

    ii)   Introduces the principles of data abstraction, inheritance and polymorphism

    iii)   Introduces the principles of virtual functions and polymorphism

    iv)   Introduces handling formatted I/O and unformatted I/O

    v)   Introduces exception handling

Course Outcomes (COs) :

After completion of the course, students will be able to -

    i)   Understand Principles of OOP's using C++

    ii)   Design and implement OOP programs using C++

    iii)   Understand Classes, Objects Inheritance and Polymorphism using C++

    iv)   Develop Object oriented programming Skills and gain practical experience

    v)   Handling exceptions to control errors

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	Introduction to object-oriented programming, input-output in C++, strings, functions, default values in functions, recursion, namespaces, operators, arrays and pointers. Abstraction mechanism: Classes, private, public, member data, member functions, inline function, friend functions, static members, and references. Inheritance: Class hierarchy, derived classes, single inheritance, multiple, multilevel, hybrid inheritance, role of virtual base class	10 Hrs
II	Constructor and destructor execution, base initialization using derived class constructors Polymorphism: Binding, Static binding, Dynamic binding, Static polymorphism: Function Overloading, Ambiguity in function overloading, Dynamic polymorphism: Base class pointer, late binding, method overriding with virtual functions, pure virtual functions, abstract classes.	10 Hrs

	Operator Overloading: Unary and Binary Operator overloading.	
III	Exception handling: Try, throw, and catch, exceptions and derived classes, function exception declaration.	**10 Hrs**
	Dynamic memory management, new and delete operators, object copying, copy constructor, assignment operator.	
	Template: template classes, template functions.	
	Namespaces: user defined namespaces, namespaces provided by library.	

Reference Books:

1. Object Oriented Programming with C++ by E. Balagurusamy, McGraw-Hill Education (India)

2. ANSI and Turbo C++ by Ashoke N. Kamthane, Pearson Education

3. Big C++ - Wiley India

4. C++: The Complete Reference- Schildt, McGraw-Hill Education (India)

5. C++ and Object Oriented Programming – Jana, PHI Learning.

6. Object Oriented Programming with C++ - Rajiv Sahay, Oxford

7. Mastering C++ - Venugopal, McGraw-Hill Education (India)

M1-DSC-8 : Practical Based on DSC-7 (Programming in C++)

Total Credits : 02   Total Contact Hours : 60 Hrs
Maximum Marks : 50

List of practical to be conducted in Laboratories: -

1. Write a C++ program to perform string manipulation.
2. Write a C++ program to perform matrix addition and multiplication.
3. Find the length of a string. Compare two strings, Concatenate two strings, Reverse a string, Copy a string to another location.
4. Write a C++ program to manipulate the class account using classes and function. A user should be able to perform the following functions.
   a. Deposit money
   b. Withdraw money
   c. Calculate the interest
   d. Check the total balance in his account.
5. Demonstrate All Types of Inheritance
6. Write a C++ program to overload a function to calculate volume of cube, cylinder and rectangular box.
7. Declare a class Demo that contains the following members.
8. Three data members for roll number, name and marks.
9. One default constructor to accept the values of the data members through keyboard.
10. One destructor member function.
11. A member function to display the contents of the data members.
12. Write a C++ program to demonstrate Polymorphism
13. Write a C++ program to demonstrate Exception Handling
14. Write a C++ program to create a class template to find the maximum of two numbers.
15. Write a C++ program to demonstrate Namespaces

M2: DSC-9 : Advanced Database Management System (ADBMS)

Total Credits : 02   Total Contact Hours : 30 Hrs

Maximum Marks : 50

Learning Objectives of the Course:

i) To teach fundamental concepts of RDBMS (PL/SQL)

ii) To teach database management operations

iii) To Be familiar with the basic issues of transaction processing and concurrency control

iv) To teach data security and its importance

Course Outcomes (COs) :

i) Design E-R Model for given requirements and convert the same into database tables.

ii) Use database techniques such as SQL & PL/SQL.

iii) Explain transaction Management in relational database System.

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	Introduction to Relational-Database Design, Functional Dependency (Basic concepts), Concept of Decomposition, Desirable Properties of Decomposition Introduction to PLSQL, Controlling the program flow, conditional statements, loops, Stored Procedures and Stored Functions, Handling Errors and Exceptions, Cursors and Triggers	10 Hrs
II	Describe a transaction, properties of transaction, state of the transaction, Executing transactions concurrently associated problem in concurrent execution, Schedules, types of schedules, concept of Serializability, Ensuring Serializability by locks, different lock modes	10 Hrs
II	Basic timestamp method for concurrency, Thomas Write Rule, Timestamps versus locking, Deadlock and deadlock handling - Deadlock Avoidance (wait-die, wound-wait), Deadlock Detection and Recovery Introduction to database security concepts	10 Hrs

Reference Books:

1. Abraham Silberschatz, Henry F Korth, S Sudarshan, Database System Concepts, McGraw-Hill, 6th Edition, 2010
1. Database Management Systems, Raghu Ramakrishnan, Mcgraw-Hill Education
2. Database Management Systems, Raghu Ramakrishna and Johannes Gehrke, McGraw-Hill Science/Engineering/Math; 3 edition, ISBN:9780072465631

3. Ramakrishnan, Gehrke, Database Management Systems, McGraw-Hill, 3rd Edition, 2003

4. Elmasri, Navathe, Somayajulu, Fundamentals of Database Systems, Pearson Education, 4th Edition, 2004.

5. NoSQL Distilled A Brief Guide to the Emerging World of Polyglot Persistence : by Pramod J. Sadalage, Martin Fowler, Addison-Wesley, Pearson Education, Inc.

6. MongoDB: The Definitive Guide , Kristina Chodorow, Michael Dirolf, O"Reilly Publications

M2: DSC-10 : Practical based on DSC-9 (ADBMS)

Total Credits : 02

Maximum Marks : 50

Total Contact Hours : 60 Hrs

List of practical to be conducted in Laboratories –

1. Practical based on DDL
2. Practical based on DML Commands
3. Practical based on DCL and TCL Commands
4. Write a query on every in Built Functions (Ex. On string , date etc.)
5. Practical using Nested Queries and Join Queries on multiple table
6. Set operators on multiple table
7. Study in built procedures and create user defined procedure
8. Study in built Function and create user defined Function
9. Create Triggers
10. Write a cursors

M3- DSC-11 : Linux Operating System

Total Credits : 02   Total Contact Hours : 30 Hrs
Maximum Marks : 50

Learning Objectives of the Course:
  i)   To introduce students the basic knowledge of open source operating system such as Linux.
  ii) To acquaint students about implementation of execution of Linux commands.
  iii) To provide Installation of Linux Operating System.
  iv) To acquaint students about Installation of various open sources software on Linux platform.

Course Outcomes (COs) :
After completion of the course, students will be able to -

i)	Upon successful completion of the course, the students will:
ii)	To acquaint students with various Linux commands and installation of open source operating system.
iii)	To cultivate implementation skill of open source operating system.
iv)	To develop skills in managing software and system administration tool.
v)	To prepare students for future courses having technical operating system knowledge.

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	Overview to Linux & Unix based operating systems Difference between Red Hat & Ubuntu, Ubuntu, History of Linux, Features of Linux, O.S. Linux Distribution, Architecture of Linux- kernel, shell, Tools and applications, Linux File System – file names, addressing of files, Directories or Files and their description, Types of Linux files, Linux Kernel, file permissions (file access modes), i-node number, Terminal window, command prompt.	10 Hrs
II	Linux commands : Command syntax, Command history, Feeding commands on prompt, ls, man, script, info, cd, pwd, cat, cp, rm, mv, mkdir, rmdir, finger, who, whoami, chmod, head, tail, page, more, nl, ln, chown, chgrp, date, cal, file, wc, cmp, tty, bc, sort, uniq, diff, comm, cut, paste, ps, kill, grep, type, spell, at, uname, nice, renice, less, free, stty, clear. Filters – vertical bar-pipe, tee , redirection I/O - <, >, >>, 2>, metacharacters.	10 Hrs

III	Installations :- Installation of Linux O.S., Commands - sudo, apt-get :- install, update, upgrade, remove, purge, auto remove, The differences between APT update and upgrade command. Installation of compilers for languages/packages – C, C++, java, JSP, MYSQL, KDE-office, PHP, R-programming, Python, Geany ID, android installation, MYSQL and MYSQL Workbench, etc. Installation of various desktop - Gnome desktop, KDE Plasma Desktop, Cinnamon Desktop, LXQt Desktop	**10 Hrs**	

Reference Books:

1. Official Ubuntu Book, 9th edition by Mattew Helmke, Elizabeth Joseph, Jose Rey

2. Beginning Ubuntu Linux: From Novice to Professional (Third Edition) by Keir Thomas - Apress; Bk&CD-Rom edition (June, 2008)

3. Linux Bible : Boot Up to Fedora, KNOPPIX, Debian, SUSE, Ubuntu , and 7 Other Distributions by Christopher Negus - Wiley; 2 edition (January 31, 2006)

4. Ubuntu Unleashed by Andrew Hudson, Paul Hudson - Sams; 1st edition (August 29, 2006)

5. Ubuntu for Non-Geeks, 3rd Edition: A Pain-Free, Project-Based, Get-Things-Done Guideboo by Rickford Grant

DSC-12 : **Practical based on DSC-11 - (Linux Operating System)**	

Total Credits : 02   **Total Contact Hours :** 60 Hrs
Maximum Marks : 50

Sample List of experiments to be carried out based on the course DSC-3. Three experiments can be carried out based on each unit. Teacher can also add experiments of their choice.

1	Obtain the Red Hat/Ubuntu Linux distribution and install it on your laptop or desktop. Start the computer in-front and login to Ubuntu Linux, Get yourself familiarized with the Ubuntu GUI interface.
2	Practical based on Linux Commands *Basic.
3	Practical based on Linux Commands. *Advanced
4	Practical based on The Command Line Interface
5	Add Panel on desktop, on panel add menu bar and various applets.
6	Install the software/compiler/application .... from software boutique/using sudo command in terminal window.
7	Install the printer (dot matrix/laser) on Computer system
8	Install the Gnome Desktop from terminal window on Computer system.
9	Install the KDE Plasma Desktop from terminal window on Computer System
10	Install Cinnamon Desktop from terminal window on computer system. make it look like windows-XP.
11	Install Geany IDE from terminal window/Software boutique. Write any program in .... Programming language, compile and execute it. (c, c++)
12	Install MySQL/PHP from terminal window on computer system.
13	Install R Programming language from Terminal Window/Software Boutique on Computer System.
14	Install the Dolphin File Manager from Terminal Window and compare it with Caja
15	Install KDE-office open source office from Terminal window and compare it with Libre Open Office.

<table>
<tr><td colspan="3" align="center">**VSC-1A : JavaScript**</td></tr>
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Total Credits : 01	Total Contact Hours : 15 Hrs
Maximum Marks : 50	

Learning Objectives of the Course:

    i)   Implementation of advance Professionalism for project management, interpersonal skills and teamwork.

    ii)   Problem finding and solution with software.

    iii) Competency for higher studies and employability.

    iv) A commitment to lifelong learning and keeping up with evolving technologies....

Course Outcomes (COs) :
After completion of the course, students will be able to -

    i)   Ability to understand fundamentals of JavaScript

    ii)   Proficiency in developing interactive and dynamic web applications.

    iii) Understanding of basic functions in JavaScript

    iv) Understand Internet and web technology.

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	Introduction to JavaScript: Overview of JavaScript, definition, features of JavaScript, Applications of JavaScript. JavaScript Variables and datatypes: JavaScript <script> tag, what is variables, global variables, what is datatype: Primitive data type and non-primitive (reference) data types	05 Hrs
II	Operators in JavaScript: Arithmetic Operators, Comparison (Relational) Operators, Bitwise Operators, Logical Operators, Assignment Operators, Special Operators JavaScript control statement: if , if else, if else if, switch Introduction to Loops: for loop, while loop, do-while loop, for-in loop.	05 Hrs
III	Functions: What is Function, Advantage of JavaScript function, JavaScript Function Syntax, JavaScript Function Arguments Built-in functions in JavaScript: Date(), getDate(), getDay(), min(), max(), round(), alert() Methods in JavaScript: getElementbyID, getElementsByClassName() Create and Access External JavaScript	05 Hrs

Reference Books:

1. A Smarter Way to Learn JavaScript by Mark Myers
2. JavaScript: The Definitive Guide by David Flanagan
3. JavaScript and jQuery: Interactive Front-End Web Development by Jon Duckett
4. Head First JavaScript Programming: A Brain-Friendly Guide by Elisabeth Robson.

VSC-1B : Basics Of Networking

Total Credits : 01   Total Contact Hours : 15 Hrs

Maximum Marks : 50

Learning Objectives of the Course:

1 To understand the concept of computer network and their applications.
2 To gain knowledge of layered network architecture and various network protocols and services
3 To understand the functions and operations of various network layers, including all layers
4 To gain knowledge of network security threats and vulnerability as well as various security protocols and encryption techniques

Course Outcomes (COs) :

1 Design and implement Computer Network
2 Analyze and troubleshoot Computer Network related problems
3 Understand the various network protocols and services
4 Understand network security threats and vulnerability, as well as various security protocols and encryption techniques

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	Overview of Computer network and their applications, Network topologies and architectures, Layered network architecture and the OSI reference model, Physical layer and its functions, Transmission medias and their characteristics, LAN,MAN,WAN, IP Address and sub netting, Transmission mode-Simplex, Half-duplex, Full-duplex	05 Hrs
II	Data encoding and modulation techniques, Error detection and correction, Data link layer and its functions, Farming, Flow control, Error control in data link layer protocol, Network layer and its functions, Routing algorithms and protocols, IPv4 and IpV6	05 Hrs
II	Transport layer and its functions, Reliable data transfer and flow control, TCP & UDP Protocols, Application layer and its functions, Client server and peer to peer architecture, HTTP, FTP, SMTP, DNS, Encryption and Decryption, Security protocols – SSL/TLS, IPSec, VPN	05 Hrs

Reference Books:

1. Computer Network – by Andrew S. Tanenbaum and David J. Watherall
2. Data Communication and networking – by Behroz A. Forouzan
1 TCP/IP and protocol suit – by Behroz A. Forouzan
2 Computer Networking : A top down approach – by James F. Kurose and Keith W. Ross

VSC-2A: Practical Based on VSC-1A (JavaScript)	
Total Credits : 01	Total Contact Hours : 30 Hrs
Maximum Marks : 50	

List of practical to be conducted in Laboratories :
Demonstrate following concepts of JavaScript-

15) Creating a JavaScript-enabled page
16) Using the JavaScript alert() method and prompt() method
17) Using the JavaScript document.write() method
18) Storing user data in a JavaScript variable
19) Assigning and adding variables in JavaScript
20) Creating a user-defined function in JavaScript
21) Using functions, arguments and return values in JavaScript
22) Calling a function from within another function in JavaScript
23) Using if, if else, if else if, switch
24) Using for loop, while loop, do-while loop, for-in loop.
25) Writing content to new windows
26) Assigning properties to a remote document dynamically
27) Applying String methods to text
28) Using the JavaScript Date(), getDate(), getDay(), min(), max(), round()
29) Using the JavaScript getElementbyID, getElementsByClassName()

VSC 2B : Practical's based on VSC-1B (Basic of Networking)

Total Credits : 01
Maximum Marks : 50

Total Contact Hours : 30 Hrs

List of practical to be conducted in Laboratories –

1   Study of different network devices like repeater, hub, switch, bridge, router, gateway etc.
2   Familiarization with Transmission media and tools: Co-axial cable, UTP cable, Crimping tool, Connectors etc.
3   To study different types of Network Cables and create the UTP straight and cross wired cable using clamping tool.
4   Study of network IP: classification, sub netting, super netting
5   Connect the computers in Local Area Network.
6   Study of basic network command and Network configuration commands.
7   Installation and introduction of simulation tools packet tracer/GNS3
8   Configuration of TCP/IP protocols in Window/LINUX.
9   Configure a Network topology using packet tracer software.
10 Configure a Network topology using packet tracer software
11 Connect mobile to computer/laptop using USB/Blootooth /WiFi to assess internet

GE/OE-2: E-Commerce and E-Contracts

Total Credits: 02   Total Contact Hours: 30 Hrs
Maximum Marks : 50

Learning Objectives of the Course:
   1. To make the student understand the E-commerce and its application.
   2. To make the student understand the Electronic Contract..

Course Outcomes (COs) :
After completion of the course, students will be able to –
   1. Understand issues in e-commerce.
   5. Understand E-Commerce and E-Business-Models and Approaches.

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	Online Business: Definition of E-Commerce, Types of E-Commerce, Important issues in Global E-commerce. Laws relating to E-Commerce, Intellectual Property Rights, International Trade Law	15 Hrs
II	E-banking, Online Payment gateways, Electronic Cheques in India. Electronic Contract: Meaning, Types and Formation of e-contracts	15 Hrs

Reference Books:
   1. Information Security and Cyber Laws, by Pankaj Sharma. S.K. Kataria & Sons
   2. Fundamentals of Cyber Security, by Bhushan, Rathore, Jamshed, BPB
   3. Cyber-security for Beginners, by Raef Meeuwisse. Cyber Simplicity Ltd
   4. A Handbook of E-commerce, by Nidhi Dhawan, Sun India Publications
   5. E-Commerce in India: Economic and Legal Perspectives, Pralok Gupta, Sage Publications India Pvt. Ltd.