

**Undergraduate Programmes
2023 May**

**Bachelor of Science in
Information Technology
(B.Sc. I.T.)
Tentative Template**

Terminologies

Abbreviation	Full-form	Remarks	Related to Major and Minor Courses
Major(Core)	Main Discipline		
Major(Elective)	Elective Options		related to the Major Discipline
Minor Stream	Other Disciplines (Inter/Multidisciplinary) not related to the Major	either from the same Faculty or any other faculty	
OEC	Open Elective Courses/ Generic		Not Related to the Major and Minor
VSEC	Vocational and Skill Enhancement Courses		
VSC	Vocational Skill Courses		Not Related to the Major and Minor
SEC	Skill Enhancement Courses		Not Related to the Major and Minor
AEC	Ability Enhancement Courses	Communication skills, critical reading, academic writing, etc.	Not Related to the Major and Minor
VEC	Value Education Courses	Understanding India, Environmental science / education, Digital and technological solutions, Health & Wellness, Yoga education, sports, and fitness	Not Related to the Major and Minor

IKS	Indian Knowledge System	I. Generic IKS Course: basic knowledge of the IKS II. Subject Specific IKS Courses: advanced information pertaining to the subject: part of the major credit.	Subject Specific IKS related to Major
OJT	On-Job Training (Internship/Apprenticeship)	corresponding to the Major Subject	Related to the Major
FP	Field projects	corresponding to the Major Subject	Related to the Major
CC	Co-curricular Courses	Health and Wellness, Yoga education sports, and fitness, Cultural Activities, NSS/NCC and Fine/Applied/Visual/Performing Arts	Not Related to the Major and Minor
CE	Community Engagement and service		Not Related to the Major and Minor
RP	Research Project	corresponding to the Major Subject	Related to the Major

ProgrammeTemplate:

<p>Programme Degree B.Sc. IT</p>	<p>Bachelor of Science in Information Technology (BScIT)</p>
<p>Parenthesis if any(Specialization) e.g. History, HumanDevelopment,English,etc.</p>	<p>NA</p>
<p>Preamble(BriefIntroductiontotheprogramme)</p>	<p>The Bachelor of Science in Information Technology (BScIT) program is designed to prepare students for dynamic and rapidly evolving careers in the field of information technology.</p> <p>This program embodies a commitment to excellence in education, innovation, and the practical application of IT knowledge. With a strong emphasis on both theory and practical skills, the BScIT program equips students with the tools and knowledge they need to succeed in the digital age. The mission of the BScIT program is to nurture and develop a new generation of IT professionals who are not only well-versed in the latest technological advancements but also possess the critical thinking and problem-solving skills required to meet the ever-changing demands of the IT industry.</p> <p>Through a holistic and hands-on approach, we aim to empower our students to become leaders and innovators in the world of technology.</p> <p>The BScIT program is committed to foster a learning environment that empowers students to be leaders and problem solvers in the ever-evolving world of information technology.</p>
<p>Programme Specific Outcomes(PSOs)</p> <p><i>Action Verbs demonstrating(Major) discipline-relatedknowledge acquisition, masteryover cognitive and professional,vocationalskillsareto beused e.g. demonstrate soundunderstandingof..,analyse, compare, create, design, etc...(minimum5)</i></p>	<p>After completing this programme, Learner will</p> <ol style="list-style-type: none"> 1. Understand fundamental concepts of information technology, including operating systems, programming languages, data structures, and algorithms. 2. Demonstrate a comprehensive understanding of hardware and software components in computer systems. 3. Develop software applications and solutions to address real-world problems using appropriate programming languages and tools 4. Compare and contrast different software development methodologies and their suitability for various projects.

	<p>5 Apply data analysis techniques to extract meaningful insights from datasets</p> <p>6. Evaluate the security vulnerabilities in IT systems and propose measures to enhance</p> <p>7. Design and develop innovative IT solutions, including web applications, mobile apps, and databases.</p>
<p>Eligibility Criteria for Programme</p>	<p>B.Sc.IT –First Year: A candidate for being eligible for admission to the course leading to the degree of Bachelor of Science in Information Technology (as per revised NEP 2020) must have passed the Higher Secondary School Certificate (Std. XII) examination conducted by the different Divisional Boards of the Maharashtra State Board of Secondary and Higher Secondary Education in Science stream with 45% marks (40% for candidates belonging to Reserved category) with the following subjects :-</p> <ul style="list-style-type: none"> • English • Any one of the Modern Indian Languages or Modern Foreign Languages or any classical Language or Information Technology/ Any four Science subjects carrying 100 marks each. <p>OR</p> <ul style="list-style-type: none"> • English • Any one vocational subject carrying 200 marks • Any three Science subjects carrying 100 marks each. <p>OR</p> <p>Must have passed an examination of any other recognized Board or Body Recognized as equivalent. Students who have not done mathematics at 12th Std. are needed to take a bridge course in mathematics and pass in university conducted test before semester 1 examination.</p> <p>OR</p> <p>1. Must have passed any three year Government recognized Diploma programme in Second Class.</p> <p>B.Sc.IT II Year :</p> <ul style="list-style-type: none"> • For a student from our University - should have cleared or has ATKT as admissible in first year in the same subject. • For a student from another University - studied at least 12 credits of major(core) courses in the first year and passed first year without ATKT. • Should have passed three years Govt./ D.T.E. recognized Diploma Course with First Class and without ATKT. <p>B.Sc.IT III Year:</p> <ul style="list-style-type: none"> • For a student from our University - should have cleared second year in the same subject or has passed with admissible ATKT.

		<p>For a student from another university– should have completed at least 28 credits of major(core) courses in the first and second year and passed first and second year without ATKT.</p> <p>B.Sc.IT IV Year:</p> <ul style="list-style-type: none"> • For a student from our University /another university- should have completed three years degree in the same discipline.
Intake (For SNTWU Departments and Conducted Colleges)		-

- *External Examination does not always mean Theory paper. It may practical examination, Product submission, projects, etc. checked by external examiners.*
- *Internal evaluation should not be written Theory papers like Unit tests. Internal marks will be acquired through practical, small group or individual Projects, activities, presentations, seminars, workshops, products, assignments, application-based work, reports, etc.*
- Practical may be part of the main courses alongwith theory modules instead of having separate courses of practical work.

StructurewithCourseTitles**(Options related to our area of study to be provided with "OR" for baskets of different types)**

SN	Courses	Type of Course	Credits	Marks	Int	Ext
Semester I						
1.1	C Programming	Major(Core)	4 (2T+2P)	100	50	50
1.2	Computer Fundamentals and Operating System	Major(Core)	2	50	0	50
1.3	Web Technology	OEC	(2T+2 P) 4	100	50	50
1.4	Office Automation	VSC	2	50	50	0
1.5	Swayam/Chetana/MOOC	SEC	2	50	50	0
1.6	Business Communication	AEC	2	50	0	50
1.7	Vedic Mathematics	IKS	2	50	0	50
1.8	Environmental Science	VEC	2	50	50	0
1.9	* Co-curricular Course	CC	2	50	50	0
			22	550	300	250
* Co-Curricular Course (Health & Wellness, Yoga education, sports & fitness, Cultural activities, NSS, NCC and Fine/applied/visual/performing arts)						
Semester II						
		Type of Course	Credits	Marks	Int	Ext
2.1	Data Structure and Algorithms	Major(Core)	4 (2T+2P)	100	50	50
2.2	Computer Organization and Architecture	Major(Core)	2	50	0	50
2.3	Mathematics I - Discrete Mathematics	Minor Stream	2	50	0	50
2.4	Object Oriented Programming using C++	OEC	4 (2T+2P)	100	50	50
2.5	Linux Operating System	VSC	2	50	0	50
2.6	Swayam/Chetana/MOOC	SEC	2	50	50	0
2.7	Technical Writing	AEC	2	50	50	0
2.8	Nutrition and Dietetics	VEC	2	50	0	50
2.9	* Co-curricular Course	CC	2	50	50	0
			22	550	250	300

ExitwithUGCcertificatewith10extracredits(44+10credits)

SN	Courses	Type of Course	Credits	Marks	Int	Ext
Semester III						
3.1	Java Programming	Major(Core)	4 (2T+2P)	100	50	50
3.2	Software Engineering	Major(Core)	4	100	50	50
3.3	Mathematics II - Numerical Methods	Minor Stream	4	100	50	50
3.4	Database Management System	OEC	2	50	0	50
3.5	Data Analytics using Excel	VSC	2	50	50	0
3.6	Swayam/Chetna/MOOC	AEC	2	50	0	50
3.7	Field Projects	FP	2	50	50	0
3.8	NCC/NSS/Sports/Cultural/Community	CC	2	50	50	0
			22	550	300	250
SN	Courses	Type of Course	Credits	Marks	Int	Ext
Semester IV						
4.1	Python Programming	Major(Core)	4 (2T+2P)	100	50	50
4.2	Advanced Java	Major(Core)	4 (2T+2P)	100	50	50
4.3	Introduction to Microprocessor 8086 (Theory & Lab (2+2))	Minor Stream	4	100	50	50
4.4	Cyber Security	OEC	2	50	0	50
4.5	Analytical skills using statistics	SEC	2	50	0	50
4.6	Modern Indian Language /Foreign Language	AEC	2	50	0	50
4.7	Green Computing	CEP	2	50	50	0
4.8	NCC/NSS/Sports/Cultural/Community	CC	2	50	50	0
			22	550	250	300

Exit with UG Diploma with 10 extra credits (44+10 credits)

SN	Courses	Type of Course	Credits	Marks	Int	Ext
	SemesterV					
5.1	Advanced Web Development using ASP.net & C# Lab	Major(Core)	4 (2T+2P)	100	50	50
5.2	Software Engineering	Major(Core)	4	100	50	50
5.3	Multimedia and Animation	Major (Core)	2	50	0	50
5.4	Elective-I	Major (Elective)	4	100	50	50
5.5	Data Visualization	Minor stream	4	100	50	50
5.6	Digital film making	VSC	2	50	50	0
5.7	Field Project/Internship	FP/CEP	2	50	50	0
			22	550	300	250
	SemesterVI					
6.1	Mobile Application Development	Major(Core)	4	100	50	50
6.2	R-Programming	Major(Core)	4	100	50	50
6.3	Mobile Application Development Lab	Major (Core)	2	50	0	50
6.4	Elective -II	Major (Elective)	4	100	50	50
6.5	Artificial Intelligence	Minor Stream	4	100	50	50
6.6	Field Projects/Internship Related to DSC	OJT	4	100	50	50
			22	550	250	300
	*DSC- Major related					

ExitwithDegree(3-year)

Elective-I	Elective-II
Dot Net Technology	Advanced Python Programming
PHP Programming	Computer Graphics

4-Year Degree with Honors

SN	Courses	Type of Course	Credits	Marks	Int	Ext
Semester VII						
7H.1	Machine Learning	Major(Core)	4	100	50	50
7H.2	Natural Language Processing	Major(Core)	4	100	50	50
7H.3	Software Testing and Quality Assurance	Major(Core)	4	100	50	50
7H.4	Software Testing and Quality Assurance Lab	Major(Core)	2	50	50	0
7H.5	Elective-III	Major(Elective)	4	100	50	50
7H.6	Research Methodology	Minor Stream(RM)	4	100	50	50
			22	550	300	259
SN	Courses	Type of Course	Credits	Marks	Int	Ext
Semester VIII						
8H.1	Deep Learning	Major(Core)	4	100	50	50
8H.2	Internet of Things (IOT)	Major(Core)	4	100	50	50
8H.3	Cloud Computing	Major(Core)	4	100	50	50
8H.4	Intellectual Property Rights and Cyber Laws	Major(Core)	2	50	0	50
8H.5	Elective -IV	Major (Elective)	4	100	50	50
8H.6	Project/ Dissertation related to Major Subject	OJT	4	100	50	50
			22	550	250	300

Elective –III	Elective –IV
UI (User Interface) / UX(User Experience) Design	MIS
Computer Networks	Ethical Hacking
Block Chain Technology	Data ware housing and mining

4-Year Degree with Research

SN	Courses	Type of Course	Credits	Marks	Int	Ext
Semester VII						
7R.1		Major(Core)	4	100	50	50
7R.2		Major(Core)	4	100	50	50
7R.3		Major(Core)	2	50	0	50
7R.4		Major(Elective)	4	100	50	50
7R.5		Minor Stream (RM)	4	100	50	50
7R.6		Research Project	4	100	100	0
			22	550	300	250
Semester VIII						
8R.1		Major(Core)	4	100	50	50
8R.2		Major(Core)	4	100	50	50
8R.3		Major(Core)	2	50	0	50
8R.4		Major(Elective)	4	100	50	50
8R.5		Research Project	8	100	100	100
			22	550	250	300

Evaluation and Grades

* Lab Components are practical oriented and no theory examinations will be conducted. Practical examinations will be conducted and evaluated by Internal and External Examiners.

• Int. Exam: C.A.: Internal examination and continuous assessment involves two internal test + Assignments/ Presentation/ Oral/ Viva/Group Discussion etc

Terms Used:

Tu.: Tutorial

Pr.: Practical
 C.A.: Continuous Assessment
 Tw.: Term Work
 Cr.: Credits
 Int.: Internal
 Ext.: External

NEP Structure and Credit Score

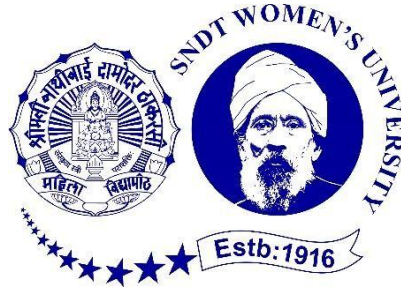
The undergraduate degree under NEP will be a multi-disciplinary program of four-year duration with multiple exit and entry options.

Description	Certificate Type	Minimum Credits Required
The successful completion of 2 semesters	Certificate	?
The successful completion of 4 semesters	Diploma	?
The successful completion of 6 semesters	Degree	?
The successful completion of 8 semesters	Honours	?

CGPA & Grades

Semester GPA / Program CGPA	Alpha-Sign / Letter Grade	Semester/Program % of Marks	Results / Class Description
9.00 – 10.00	O (Outstanding)	90.0 – 100	Outstanding
8.00 – < 09.00	A+ (Excellent)	80.0 – < 90.0	First Class Exemplary
7.00 – < 08.00	A (Very Good)	70.0 – < 80.0	First Class Distinction
6.00 – < 07.00	B+ (Good)	60.0 – < 70.0	First Class
5.50 – < 06.00	B (Above Average)	55.0 – < 60.0	High Second Class
5.00 – < 05.50	C (Average)	50.0 – < 55.0	Second Class
4.00 – < 05.00	P (Pass)	40.0 – < 50.0	Pass Class
Below 04.00	F (Fail)	Below 40.00	Fail / Reappear
Absent	Ab	Absent	

SNDT Women's University, Mumbai



Syllabus as per NEP 2020

**Bachelor Of Science in Information
Technology (B. Sc. I.T.)(2024-2025)**

1, Nathibai Thackersey Road, Mumbai- 400020

www.sndt.ac.in

Course Syllabus

Semester: I

1.1 Major (Core)- C Programming (Theory)

Course Title	C Programming (Theory)
Course Credits	2
Course Outcomes	<ol style="list-style-type: none">1. To develop logic which will help them to create programs in C.2. Demonstrate an understanding of computer programming language concepts.3. Ability to design and develop Computer programs, analyze, and interpret the concept of pointers, declarations, initialization, operations on pointers and their usage.4. By learning the basic programming constructs, they can easily switch over to any other language in future.5. The students will be able to develop applications
Module 1 (Credit 1)	
Learning Outcomes	<p>After learning the module, learners will be able to</p> <ol style="list-style-type: none">1. Understand the concepts and techniques in problem solving.2. Understand the Algorithm and flowchart concept.3. Understand basic concepts and storage types.4. Understand structure, Keywords, operators, functions of C programming5. Learn concept of I/O Function, concept of header files, preprocessor directives.
Content Outline	<p>Introduction to problem solving:</p> <ol style="list-style-type: none">1. Concept: Steps in problem solving (Define Problem, Analyze Problem, Explore Solution),2. Problem solving techniques : (Trail & Error, Brainstorming, Divide & Conquer)3. Algorithms and Flowcharts (Definitions, Characteristics, Advantage & Disadvantages, Symbols, Examples), Pseudo-code(Definition,Conditional statements, Loops), etc. <p>Overview of programming languages:</p> <ol style="list-style-type: none">1. Definition of the program, Concept- Source code, Object code, Compilation, Interpretation, Execution,2. Input and Output, Debugging etc., Expressions, control structures; subroutines, Storage

	<p>management; scoping rules; bindings for names,</p> <p>3. Storage types: Automatic , external, register and static variables</p> <p>Introduction to ‘C’ Language : History of C Programming , Structures of ‘C’ , Programming, Simple example, Basic Input/ Output, Function as building blocks. Language Fundamentals : Character set, C Tokens, Keywords, Identifiers, Variables, Constant, Data Types, Comments</p> <p>Operators : Types of operators, Precedence and Associativity, Expression. Statement and types of statements, Built in Operators and function., Console based I/O and related built in I/O Function: printf(), scanf(), getch(), getchar(), putchar(),etc; Concept of header files, Preprocessor directives: #include, #define, Conditional statements and Loops</p>
Module 2 (Credit 1)	
Learning Outcomes	<p>After learning the module, learners will be able to</p> <ol style="list-style-type: none"> 1. Gain proficiency in writing C programs to solve various problems 2. learn the syntax and semantics of the C language, including its specific features such as pointers and memory management. 3. Learn difference between structure and Union 4. Handle the operations of the files
Content Outline	<p>Control structures Decision making structures:If, If-else, Nested If –else, Switch, Loop Control structures While, Do-while, For, Nested for, while, do-while loop, jumping statements: break, continue, goto, exit.</p> <p>Functions: Definition, Basic types of function, Declaration and definition, Function call, Types of function, Parameter passing, Call by value, Call by reference, Scope of variables, Recursion, String: Declaration, string Functions, String Manipulations</p> <p>Pointers: Introduction to pointers, Pointer notation, Pointer arithmetic, Null Pointer</p> <p>Arrays: Definition, Declaration, Initialization, Bounds checking, One-Dimensional Array, Two-Dimensional Array, Passing array to a function, pointer to Array</p> <p>Structure and Union: Introduction to Structure, Definition, Declaration of Structure Variables, Dot Operator, Nested Structure, Array of Structure, pointer to structure, Introduction to Union, Difference between Structure and Union</p>

	<p>File Handling: Concept of File, Definition, File operations (create, open, read, move, write, close), File opening Mode, Closing a file, Input/output operations, Creating and reading a file, Command Line Argument</p>
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Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Assignments can range from simple tasks to complex projects.
2. Evaluate their problem-solving approach, algorithm design, and logic
3. Conducting regular quizzes and tests to assess students' theoretical knowledge of C programming concepts

References:-

1. C: The Complete Reference (Fourth Edition), Herbert Schildt, Tata McGraw-Hill Education Pvt. Ltd., 2000
2. Ramkumar and Agrawal, “Programming in ANSI C”, Tata McGraw Hill, 1996.
3. Y.P Kanetkar, “Let Us “C” , , Infinity Science Press,2008

Course Syllabus

Semester: I

1.1 Major (Core)- C Programming Lab

Course Title	C Programming Lab
Course Credits	2 Credits
Course Outcomes	<ol style="list-style-type: none"> 1. Read, understand and trace the execution of programs written in C language. 2. Write the C code for a given algorithm. 3. Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor. 4. Write programs that perform operations using derived data types. 5. Implement simple file operations 6. Read, understand and trace the execution of programs written in C language.

Learning Outcomes	<p>After learning this Module, learners will be able to</p> <ol style="list-style-type: none"> 1. write simple programs on operators 2. Implement header files and preprocessor directives 3. Apply control, iterative, jumping statements 4. Understand break and continue statement and apply it
Module 1 (1 Credit)	
Content Outline	<p>Simple Program of C</p> <p>Implementation of Operators :Built in Operators and function, Arithmetic, Logical, Relational, bitwise, Precedence and Associativity, composite statements. Unary, binary and ternary operators.</p> <p>Concept of header files, Preprocessor directives: #include, #define. And macros implementations , Implementation of Storage types: Automatic external, register and static variables</p> <p>Console based I/O and related built in I/O function: printf(), scanf(), getch(), getchar(), putchar();</p> <p>Control Statement: Decision Making Statements, if, Nested if, if-else, Nested if-else, if-else-if, switch, etc. The Conditional Expression; Iterative Statements- The for loop, . The while loop, The do-while loop; Jumping Statements- The goto label ,The break & continue, The exit() function</p>
Module 2 (1 Credit)	
Learning Outcomes	<p>After learning this Module, learners will be able to</p> <ol style="list-style-type: none"> 1. Implement the Functions in the program 2. Understand declaration and initialization of pointers 3. Passing of array to a function 4. Able to understand defining and declarations of structure variable in the program 5. Understand Reading and writing files functions
Content Outline	<p>Implementation of Functions: Defining and accessing, passing arguments,Function prototypes, function calling mechanism, call by value, call by reference, recursive function; String Manipulations</p> <p>Pointer Declaration and Initialization of Pointer variables, pointer Arithmetic, Pointers and Character Strings</p> <p>Implementation of 1-D and multidimensional Array, One-Dimensional Array, Two-Dimensional Array, Passing array to a function, pointer to Array.</p> <p>Programs Using Structure and Union : Defining and Declaring Structure Variables, .Dot Operator, Nested Structure, Array of Structure, pointer to structure, Examples of Union.</p> <p>Programs using I/O Operations File Handling: File Operations</p>

	(Create, open, read, move, write, close) Input/output operations on file Character by –(fgetc, fputc), Reading and writing files
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Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Assignments can range from simple tasks to complex projects.
2. Evaluate their problem-solving approach, algorithm design, and logic
3. Conducting regular quizzes and tests to assess students' theoretical knowledge of C programming concepts

References:-

Text Book:

1. C – programming E.Balagurusamy, Tata McGray Hill, 1990

Reference Books:

1. C: The Complete Reference (Fourth Edition), Herbert Schildt, Tata McGraw-Hill Education Pvt. Ltd., 2000
2. Ramkumar and Agrawal, “Programming in ANSI C”, Tata McGraw Hill, 1996.
3. Y.P Kanetkar, “Let Us “C” , , Infinity Science Press,2008

Course Syllabus

Semester: I

1.2 - Major (Core)- Computer Fundamentals and Operating System

Course Title	Computer Fundamentals and Operating System
Course Credits	Credit: 02
Course Outcomes	<ol style="list-style-type: none"> 1. To understand basic organization of computer and different computer peripherals and interfaces 2. To define different number systems their interconversion and binary arithmetic. 3. To understand the basics of Networking 4. To Understand the main components of an operating system and their functions. 5. e) To Understand the all functions of an operating system.
Module 1 (Credit 1)	

Learning Outcomes	<ol style="list-style-type: none"> 1. After learning the module, learners will be able to 2. Learn all number systems of computer. 3. Learn types of computer and types of memory.
Content Outline	<p>Number Systems: Binary, Octal, Decimal, Hexadecimal and Their interconversion, Computer Arithmetic.</p> <p>Computer Software: System and Application Software.</p> <p>Type of Computers: Digital, Analog, Hybrid Computers</p> <p>Definition: Data, Information; Characteristics and Interpretation, Data & it's logical & physical Concepts, Definition of Computer, Features, Block Diagram of Computer System, Computer Generations,</p> <p>Primary Memory Devices: RAM, ROM, PROM, EPROM, CACHE Memory, Registers.</p> <p>Computer Languages: Machine, Assembly, High Level</p> <p>Operating System: Purpose of Operating Systems, OS Structure, Services of Operating System, Types of Operating System</p> <p>Processes: Concept, process states, Scheduling, Operations on Processes, Cooperating Process, Process Synchronization.</p>
Module 2 (Credit 1)	
Learning Outcomes	<p>After learning the module, learners will be able to</p> <ol style="list-style-type: none"> 1. Learn types of CPU Scheduling Algorithm 2. Learn CPU Page replacement Algorithm
Content Outline	<p>CPU Scheduling: Concept, Scheduling Criteria, Scheduling Algorithms (FCFS, SJF, RR, Priority).</p> <p>Memory Management: Concept, Swapping, Contiguous Memory Allocation, Paging, Segmentation.</p> <p>Page Replacement policies: Least Recently used (LRU) Optimal (OPT), Second Chance (SC), First in First Out (FIFO), Not recently used (NRU), Most Recently Used (MRU).</p>

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Assign Regular Problems that covers Various topics of operating system include mix of theoretical and Problems to assess students Understanding of Concept
2. – Assign various activities of operating system

Course Syllabus

Semester: II

1.3 Web Technology

Course Title	Web Technology (HTML, CSS, PHP, Java Script)
Course Credits	2
Course Outcomes	<ol style="list-style-type: none">1. To design web pages using HTML5 language, applying stylish information to web pages using CSS.2. To develop interactive web pages using JavaScript.3. To develop dynamic pages on the web server using PHP language and implement Database driven website.4. To develop and implement client-side and server-side scripting language programs
Module 1 (Credit 1)	
Learning Outcomes	<p>After learning the module , learners will be able to</p> <ol style="list-style-type: none">4. To understand basic web and security concepts.5. To understand HTML concepts.
Content Outline	<p>Introduction to web and Security Concepts HTTP:Overview – HTTP Basics, Client request, Server response; HTTP Headers; Session Management – Persistent connections, Cookies. General concepts on web server: virtual hosting, General concepts of caching proxy server , Web security, Digital signatures, Digital Certificates, Encryption, and Authentication</p> <p>HTML5 Basics of HTML elements and Tags. Introduction of HTML5 (evolutions, limitation of HTML4, advantages of HTML5, Overview of HTML5)</p> <p>Page Layout of Semantic Elements (Header, Navigation, Section & Articles, Footer Organizing Text in HTML, Links and URLs in HTML, Tables in HTML, Images on a Web Page, Image Formats, Image Maps, Colors, FORMs in HTML, Frames in HTML Working with Multimedia -Inserting Audio and Video on a web page,audio video file format.</p> <p>HTML5 Web Forms HTML 5 Global Attributes Displaying a Search Input Field, Contact Information Input Fields, Utilizing Date and Time Input Fields, Number Inputs, Selecting from</p>

	a Range of Numbers, Selecting Colors, Creating an Editable Drop-Down, Requiring a Form Field, Autofocusing a Form Field, Displaying Placeholder Text.
Module 2 (Credit 1)	
Learning Outcomes	After learning the module , learners will be able to
	1. To create HTML web page using CSS and java script.
	2. To develop programs in HTML using PHP,SQL.
Content Outline	<p>CSS: Understanding the Syntax of CSS, CSS Selectors, Inserting CSS in anHTML Document, CSS properties to work with- background of a Page, CSS Fonts and Text Styles,positioning an element</p> <p>JavaScript: Using JavaScript in an HTML Document, Programming Fundamentals of JavaScript - Variables, Operators, Control Flow Statements, Popup Boxes, Core JavaScript (Properties and Methods of Each) : Array, Boolean, Date, Function, Math, Number, Object, String, regExp, Events and Event Handlers, Browser Objects - Window, Navigator, History, Location, Document, Cookies, Document Object Model, Form Validation using JavaScript.</p> <p>INTRODUCTION TO PHP AND SQL: - Server-side web scripting, Installing PHP, SQL, Adding PHP to HTML, Syntax and Variables, Passing information between pages.</p>

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Creating HTML Pages using various tags.
2. Creating HTML Web pages using CSS and JavaScript.
3. Creating assignments using PHP
4. Creating assignments using PHP and SQL

References:-

1. Web Design The complete Reference, Thomas Powell, Tata McGrawHill
2. HTML and XHTML The complete Reference, Thomas Powell, Tata McGrawHill
3. JavaScript 2.0 : The Complete Reference, Second Edition by Thomas Powell and Fritz Schneider
4. PHP : The Complete Reference By Steven Holzner, Tata McGrawHill

Text Book :

1. Web Programming, Guy W. Lecky Thompson, 2009, Cengage Learning.

1.3 Web Technology Lab

Course Title	Web Technology Lab
Course Credits	2
Course Outcomes	<p>1.To design web pages using HTML5 language, applying stylish information to web pages using CSS.</p> <p>2.To develop interactive web pages using JavaScript.</p> <p>3. To develop dynamic pages on the web server using PHP language and implement Database Driven Websites.</p> <p>4. To develop and implement client-side and server-side scripting language programs</p>
Module 1 (Credit 1)	
Learning Outcomes	<p>After learning the module, learners will be able to</p> <p>6. To create HTML web page using various tags</p> <p>7. To design web pages using HTML5 language, applying stylish information to web pages using CSS.</p>
Content Outline	<p>Use of Basic Tags, Image maps, Tables, Forms and Media Design webpages using the given tools in HTML Navigation, Section & Articles, Footer, aside and more. Organizing Text in HTML, Links and URLs in HTML, Tables in HTML, Images on a Web Page, Image Formats, Image Maps, Colors, FORMs in HTML, Frames in HTML Interactive Elements, Working with Multimedia - Audio and Video File Formats, HTML elements for inserting Audio / Video on a web page</p> <p>CSS Syntax of CSS, CSS Selectors, Inserting CSS in an HTML Document, CSS properties to work with background of a Page, CSS properties to work with Fonts and Text Styles, CSS properties for positioning an element</p>
Module 2 (Credit 1)	
Learning Outcomes	<p>1. After learning the module, learners will be able to</p> <p>2. To design HTML web page using JavaScript,PHP and SQL.</p>

Content Outline	<p>Java Script Control and looping statements and Java Script reference Using JavaScript design, a web page; Control Flow Statements, Design a web page demonstrating different conditional statements. Design a web page demonstrating different looping statements; Pop up Boxes, Core JavaScript (Properties and Methods of Each) : Array, Boolean, Date, Function, Math, Number, Object, String, regExp, Events and Event Handlers</p> <p>PHP & SQL Demonstrate program in PHP, Installing PHP, SQL, Adding PHP to HTML, Syntax and Variables, Passing information between pages.</p>
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Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. To design HTML web page using various tags.
2. To implement CSS in HTML web page.
3. To create PHP programs and adding PHP to HTML.
8. To create SQL queries.

References:-

Text Book :

1. Web Programming, Guy W. Lecky Thompson, 2009, Cengage Learning

Reference Books:

1. Web Design The complete Reference, Thomas Powell, Tata McGrawHill
2. HTML and XHTML The complete Reference, Thomas Powell, Tata McGrawHill
3. JavaScript 2.0 : The Complete Reference, Second Edition by Thomas Powell and Fritz Schneider
4. PHP : The Complete Reference By Steven Holzner, Tata McGrawHill

Course Syllabus

Sem-I

1.4 Office Automation

Course Title	Office Automation
Course Credits	2
Course Outcomes	On completion, the students would be able to make word documents, spreadsheets, power point presentations using the Microsoft suite of office tools.
Module 1 (Credit 1)	
Learning Outcomes	<ol style="list-style-type: none"> 1.To create word documents. 2. To create Spread sheets 3. To create Power point presentations

Content Outline	<p>Operating Computer using GUI based OS, Communicating using the Internet, WWW & Web Browsers, Communication & Collaboration. Browsers and its types, internet browsing, searching - Search Engines - Portals - Social Networking sites- Blogs - viewing a webpage, downloading and uploading the website. Creating an email-ID, e-mail reading, saving, printing, forwarding and deleting the mails, checking the mails, viewing and running file attachments, addressing with cc and bcc.</p> <p>Introduction to MS-WORD: Applications and its Usages; Working with documents: Basics, starting Word, creating document, parts of Word window, mouse and keyboard operations, designing a document, opening, closing of document creating styles / tables / drawing tools / printing documents- selection, cut, copy, paste; Toolbars, operating on text; Printing, saving, Creating a template; Tables, borders, pictures, text box operations; Mail Merge, hyperlink, bookmark, cross-reference, Track changes, page layouts, Wrapping, Setting Document styles, Table of Contents, Index, Page Numbering; Shortcut keys</p>
Module 2 (Credit 1)	
Learning Outcomes	1.To Prepare spreadsheets and presentations.
Content Outline	<p>Introduction to MS EXCEL:- Applications and its Usages; Working with spreadsheets: navigating, Excel toolbars and operations, Formatting; copying data between worksheets; entering formula, chart creation; data forms, Formatting Spreadsheets, Mathematical Formulas, Working with sheets – Sorting, Filtering, Validation, Consolidation, and Subtotal, Creating & Using Templates, Pivot Tables, Tracking Changes Functions in Excel ROUND(), SQRT (), MAX(), MIN(), AVERAGE(), COUNT(), SUMIF(), SUMIF(), ABS(), ROMAN(), UPPER(), LOWER(), CELL(), TODAY(), NOW()</p> <p>Introduction to MS POWER POINT:- Working with Power Point Window, Standard Tool Bar, Formatting tool bar, Drawing tool Bar, Moving the Frame, Inserting Clip Art, Picture, Slide, Text Styling, Send to back, Entering data to graph, Organization Chart, Table, Design template, Master Slide, Animation Setting, Saving and Presentation , auto Content Wizard, Adding Effects to the Presentation- Setting Animation & transition effect. Printing Handouts, Generating Standalone Presentation viewer.</p> <p>INTRODUCTION TO MS-ACCESS:- Introduction, What is Database, Creating a New Database, Creating Tables, Working with Forms, Creating queries, running queries, Creating Reports,</p>

	Types of Reports, Printing of documents, Importing data from other databases viz. MS Excel etc.
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Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. To Prepare documents using MS-Word
2. To prepare spreadsheets using MS-Excel
3. To Prepare presentation using MS-PowerPoint.

References:-

Text Book:

1. Computer fundamentals by P.K. Sinha, BPB Publications, 2004

Reference Books:

1. Computers today by Sanders, McGraw-Hill, 1988
2. W.Stallings “ Data and Computer Communication”, 7th Edition, Prentice Hall, 2004
3. Dr. S. B. Kishor, INFORMATION AND COMMUNICATION TECHNOLOGY, 3rd Ed. published by DAS
GANU Prakashan, Nagpur on Sep. 2015. (1st Ed. July 2013, 2nd Ed. Sep. 2014)) (ISBN : 978-93-81660-73-7)

Course Syllabus

Semester: I-

1.5 Swayam/Chetana/MOOC - Skill Enhancement Course (SEC)

Course Syllabus

Semester: I

1.6 Business Communication (AEC)

Course Title	Business Communication
Course Credits	2
Course Outcomes	Enable the students’ ability to write error free while making an optimum use of correct Business Vocabulary & Grammar.
	Will enable the students to distinguish among various levels of organizational communication and communication barriers while developing an understanding of Communication as a process in an organization.

	They will be able to draft effective business correspondence with brevity and clarity.
	Enhance critical thinking by designing and developing clean and lucid writing skills.
	Enhance verbal and non-verbal communication ability through presentations.
Module 1 (Credit 0.5)	
Learning Outcomes	After learning the module, learners will be able to
	1. Understand SWOT Analysis
	2. Understand the fundamental concepts and methods of communication.
Content Outline	<p>Ice Breaking Introduction to know more about the Trainer/Teacher and Candidates</p> <p>SWOT Analysis To Identify Individual and Business Strengths/ Weaknesses/ Opportunities/Threats Introduction The SWOT framework Application of SWOT Case study</p> <p>Communication Basics of Communication Factors of Communication Barriers to Communication – Physical, Psychological, Semantics, Organizational and Interpersonal Barriers; How to overcome Barriers.</p>
Module 2 (Credit 0.5)	
Learning Outcomes	After learning the module, learners will be able to
	1. Understand positive body language for better connection.
	2. Students are able to understand how to build strong vocabulary for effective writing and communication.
Content Outline	<p>Body Language To Learn Positive body Language using Non-verbal Communication Non Verbal Communication- Personal appearance, Facial Expression, Movement, Posture, Gesture, Eye Contact etc.</p> <p>Vocabulary Building Root words (Etymology) Meaning of Words in Context Synonyms & Antonyms</p>

	Collocations Prefixes & Suffixes Standard Abbreviations
Module 3 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to
	1. Understand to promote technology driven communication through Emails, telephone and Power Point presentations.
	2. Understand how to facilitate fluent speaking skills in social, academic and professional situations.
Content Outline	<p>Technology driven writing Email Etiquettes To Learn Email writing skills</p> <ul style="list-style-type: none"> ● Format of Emails ● Features of Effective Emails <p>Language and style of Emails</p> <p>Téléphone Étiquettes To handle Telephonic round of Interview Telephone communication techniques Telephone Etiquettes</p> <p>Public Speaking Finding out environment Preparing text Composition of presentation Using Visual aids Speakers Appearance and Personality</p> <p>Applications of above using 1) Group Discussion To assess Candidates' Public speaking skills 2) Personal Interviews Conducting Mock/Personal Interviews to perform well during Interviews</p>

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. SWOT Analysis
2. Email Writing
3. Public speaking
4. Group Discussion

References:-

1. Urmila Rai and S. M. Rai, 'Business Communication', Himalaya Publishing House
2. Alan Sarsby, SWOT Analysis-a guide to SWOT for Business Studies Students
3. Sanjay Kumar & Pushp Lata, 'Communication Skills – A workbook ', New Delhi: Oxford University Press.

4. M Ashraf Rizvi, 'Effective Technical Communication', McGraw-Hill.
5. Locker, Kitty O. Kaczmarek, Stephen Kyo. (2019). 'Business Communication: Building Critical Skills', McGraw-Hill.
6. Murphy H, 'Effective Business Communication', McGraw-Hill.
7. Raman & Sharma, 'Technical Communication: Principles and practice', New Delhi: Oxford University Press.

Course Syllabus

Semester: 1

1.7 IKS

Course Title	Vedic Mathematics
Course Credits	2
Course Outcomes	Understand Ancient Vedic Maths techniques
	Learn Faster Calculation Methods
Module 1 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to solve problems on
Content Outline	<ul style="list-style-type: none"> • Introduction of Vedic Maths • Benefits of Vedic Maths • Difference between general Maths and Vedic Maths • Mental Maths Addition • Rapid Addition- Single to Double-Digit • Rapid Addition- Double to Double-Digit • Rapid Addition- Triple to Triple-Digit • Left to Right Addition
Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to solve problems on
	Apply rapid multiplication methods
Content Outline	<ul style="list-style-type: none"> • Multiplication with Double Digit to Single Digit numbers • Multiplication by Multiples of 10 • Traditional Multiplication • Multiplication with Tricks

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Assign regular problem sets that cover various topics of addition and multiplication

References /Text Books :-

Mental Calculation by Bharati Krishna Tirtha
 Vedic Mathematics by Bharti Krishna Tirtha

Course Syllabus

Semester: I

1.8 Environmental Science (VEC)

Course Title	EVS (Environmental Science)
Course Credits	02
Course Outcomes	<ul style="list-style-type: none"> • Understand and apply basic concepts of Environment and its need of protection and preservation.
	<ul style="list-style-type: none"> • Understand Multidisciplinary nature of EVS and ways to contribute to it.
	<ul style="list-style-type: none"> • To learn Ecosystem , its types and interdependency in nature.
	<ul style="list-style-type: none"> • To understand Pollution , Green computing.
	<ul style="list-style-type: none"> • Understand Biodiversity and nature of resources in India.
(Unit) Module 1 (Credit 1)	
Learning Outcomes	After learning the Module, learners will be able to
	9. Understand Multidisciplinary nature of EVS and ways to contribute to it.
	10. Learn All Natural resources and its aspects.
	11. To learn Ecosystem, its types and interdependency in nature. To get aware about Energy flow system of Nature.
Content Outline	<p>Environmental studies:-Definition, scope and importance. Multidisciplinary nature of EVS. Need for public awareness.</p> <p>Natural Resources: - Renewable and non-renewable resources, Natural resources and associated problems.</p> <ul style="list-style-type: none"> • Forest Resources: Use and over-exploitation, deforestation. Water resources: Use and over-utilization of surface and groundwater. • Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. • Food resources: World food problems, changes caused by agriculture and overgrazing. • Energy resources: Growing energy needs, renewable alternate

	<p>energy sources.</p> <ul style="list-style-type: none"> Land resources: Land as a resources, <p>Ecosystem: -</p> <ul style="list-style-type: none"> Concept of an ecosystem, Structure and function of an ecosystem, Energy flow in the ecosystem Types of Ecosystem: -Forest, Grassland, Desert, Aquatic
(Unit) Module 2 (Credit 1)	
Learning Outcomes	After learning the Module, learners will be able to
	1. Learn Pollution , its types and controlling measures
	2. Identify measures to handle Biodegradable and non - biodegradable wastes.
	3. Identify role of IT in Environment protection.
Content Outline	<p>Environmental Pollution: - Introduction</p> <ul style="list-style-type: none"> Types of Environmental Pollution: - Air, Water, Soil, Noise, Thermal, (Definition, Causes, effects and control measures of each) <p>Environment and Social issues: -</p> <ul style="list-style-type: none"> Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Biodegradable and non -biodegradable wastes. Role of an individual in prevention of pollution. <p>Green computing- Introduction, advantages, application area.</p> <ul style="list-style-type: none"> Present Problems: Toxins, Power Consumption, Equipment Disposal, Company’s Carbon Footprint: Measuring, Details Plan for the Future, Cost Savings: Hardware, Power. Information Technology role in Environment and Human Health

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

- Visit to a local area to document environmental assets river/ forest/grassland/hill/mountain along with pollution observed there.
- Study of simple ecosystems-pond, river, hill slopes, etc.
- Field visit to study Rain Water Harvesting, Solar Systems, Solid Waste Management.
- Essay/ Oratory competition for identifying role of an individual in conservation of natural resources.

References: -

- Perspectives in Environmental studies- Anubha Kaushik, C P Kaushik
- Environmental studies- Dr. S M Anas Iqbal, Dr. Upendra Sing Panwar
- Green IT’, Toby Velte, Anthony Velte, Robert Elsenpeter, McGraw Hill,2008
- ‘Green Data Center: Steps for the Journey’,Alvin Galea, Michael Schaefer, Mike Ebbers, Shroff Publishers and Distributers,2011

5. 'Green Computing Tools and Techniques for Saving Energy, Money and Resources', Bud E.Smith, CRC Press,2014

Course Syllabus

Semester: II

2.1 Major (Core)- Data Structures and Algorithms

Course Title	Data Structures and Algorithms
Course Credits	Major- 2 Credit (Theory)
Course Outcomes	CO1: Understand basic data structures such as array, linked list, stack, queue, binary tree and graph along with algorithms.
	CO2: Ability to analyze and implement algorithm
	CO3: Implement abstract data structures using Arrays and Linked list
	CO4: Apply searching and sorting techniques.
Module 1 (Credit 1)	
Learning Outcomes	<ul style="list-style-type: none"> 12. Understand basic data structures 13. Understand analysis of Algorithm 14. Understand linear data structures stack, Queue and Linked list 15. Implement various operations on linear data structures
Content Outline	<p>Chapter 1: Algorithm Analysis Algorithm Characteristics, Space complexity, Time complexity. Asymptotic notation (Big O, θ, Omega and Theta)</p> <p>Chapter 2: Introduction Introduction to data structure, Classification of data structure, Operations performed on data structures, Linear data structure, arrays, operations on an array</p> <p>Chapter 3: Linked List Introduction, Key terms, Advantages & disadvantages, Linear linked lists - Types (Singly, Doubly, Circular) Operations (Inserting, Deleting nodes)</p> <p>Chapter 4: Stack Introduction, Stack implementation, Operations on stack (Push Pop), Implementation of stack using pointer, Applications of stack, Infix prefix, postfix notations</p> <p>Chapter 5: Queue Introduction and Queue implementation, Operations</p>
Module 2 (Credit 1)	

Learning Outcomes	4. Understand non-linear data structures Trees and Graphs
	5. Implement various operations on non-linear data structures 6. Understand sorting algorithms 7. Understand Searching techniques
Content Outline	<p>Chapter 6: Trees Introduction, terminology, Binary tree, Strictly Binary tree, Complete Binary tree, Binary tree representation as Array and Linked lists, Traversal (Inorder, Preorder, Post order), Binary Search Tree</p> <p>Chapter 7: Graphs Introduction, terminology, Graph representation, Applications of graph, Graph traversal (BFS, DFS, Shortest path), Spanning tree, Minimum spanning tree</p> <p>Chapter 8 Sorting & Searching Bubble Sort, Selection Sort, Quick Sort, Heap Sort, Insertion Sort. Linear Search , Binary Search</p>

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ion (CCE)

1. –Implement basic operations using algorithm (All data structures)
2. – Implementation of Prefix, postfix and infix notations
3. – Discuss various real time applications of various data structures

References:-

1. Trembley&Sorrenson, “ Data Structure”, 2005
2. Lipschuz, “Data structures” , (Schaum’s Outline Series Mcgraw Hill Publication)
3. Ellis Horowitz and SartajSawhney, “Fundamentals of Computer Algorithms”
4. Aho, Hopcroft and Ullman, “Data Structures and Algorithms”
5. AbhayAbhyankar, “Data Structures and Files”
6. G.S. Baluja, “Data Structures Through C”
7. Mary E. S. Loomis, “Data Management and File Structures”, Prentice Hall, 2nd ed. edition (January 1989)
8. Classical Data Structures : D. Samanta, PHI, New Delhi

2.1 Major (Core)- Data Structures and Algorithms Lab

Course Title	Data Structures and Algorithms Lab
Course Credits	Major- 2 Credit
Course Outcomes	CO1: Select appropriate data structures as applied to specified problem definition.

	CO2: Implement operations like traversing, insertion, deletion and searching etc. on various data structures.
	CO3: Students will be able to implement linear and non - linear data structures.
	CO4: Implement appropriate sorting and searching techniques for given problems.
Module 1 (Credit 1)	
Learning Outcomes	1.Understand basic operations 2.Implement various operations on Array 3. Implement linear data structures stack, Queue 4. Implement various operations on linear data structures
Content Outline	Chapter 1: Arrays: Implementations of Array and Operations- Insertion, deletion of an element from one dimensional array, Traversing of array Chapter 2: Linked List Implementation of List and Linked List and Operations- Inserting, Deleting of nodes etc Chapter 3: Stack Stack Implementation, Operations on stack (Push Pop). Implementation of stack Chapter 4: Queue Implementation of Queue Implementation, Operations on queue(Insertion and deletion)

Module 2 (Credit 1)	
Learning Outcomes	1.Understand non-linear data structures Trees and Graphs 2.Implement various operations on non-linear data structures 3. Understand sorting algorithms 4. Understand Searching algorithms
Content Outline	Chapter 5 : Trees Implementation of tree as Array and Linked lists and Traversal (Inorder, Preorder, Postorder) Chapter 6: Graphs Implementation of Graph traversal (BFS, DFS) Chapter 7 Sorting and Searching Implementation of searching (Sequential, Binary search) Sorting (Bubble sort, Selection sort, Insertion Sort.)

Data Structures Lab Unit wise

program list

Module 1

(Topic: Array , Linked List)

1. Write a Program to insert 10 elements in array.
2. Write a Program to display elements in array
3. Write a Program to display elements in array in reverse order.
4. Write a Program to delete elements from array.
5. Write a program to insert node in singly linked list
6. Write a program to delete node from singly linked list
7. Write a program to display total number of node inserted in singly linked list

(Topic: Stack, Queues)

1. Write a program to check whether stack is full or not?

2. Write a program to check whether stack is empty or not?
3. Write a program for stack PUSH operation.
4. Write a program for stack POP operation.
5. Write a program to check whether Queue is full or not?
6. Write a program to check whether Queue is empty or not?
7. Write a program to insert element in queue.
8. Write a program to delete element from queue.

Module 2

(Topic: Trees, Graphs)

1. Write a program for BFS
2. Write a program for DFS
3. Write a program to find out shortest path
4. Write a program for inorder tree traversal
5. Write a program for preorder tree traversal
6. Write a program for postorder tree traversal

(Topic: Searching, Sorting)

1. Write a program for sequential/Linear search
2. Write a program for Binary search
3. Write a program for Bubble sort
4. Write a program for selection sort
5. Write a program for insertion

References:-

1. Trembley&Sorenson, “ Data Structure”, 2005
2. Lipschuitz, “Data structures” , (Schaum’s Outline Series Mcgraw Hill Publication)
3. Ellis Horowitz and SartajSawhney, “Fundamentals of Computer Algorithms”
4. Aho, Hopcroft and Ullman, “Data Structures and Algorithms”
5. AbhayAbhyankar, “Data Structures and Files”
6. G.S. Baluja, “Data Structures Through C”
7. Mary E. S. Loomis, “Data Management and File Structures”, Prentice Hall, 2nd ed. edition (January 1989)
8. Classical Data Structures : D. Samanta, PHI, New Delhi

Course Syllabus

Semester: II

2.2 Major (Core)- Computer Organization and Architecture

Course Title	Computer Organization And Architecture
Course Credits	Credit: 02

Course Outcomes	<ol style="list-style-type: none"> 1. To give a basic understanding of concepts and structure of computers. 2. To study the working of different interrupts & Mapping Techniques, to study register organization. 3. To understand the different addressing modes. 4. To demonstrate the working of central processing unit and RISC and CISC Architecture. 5. To develop an understanding of different components of computer networks, various protocols, modern technologies and their application
Module 1 (Credit 1)	
Learning Outcomes	<ol style="list-style-type: none"> 1. After learning the module, learners will be able to 2. Learn basic structure of computer of computer 3. Learn Memory Organization.
Content Outline	<p>Basic Structure of computers: Basic organization of computer, Intel 8086 Architecture, Basic Measures of Computer Performance, CPU: Registers, Computer Function: Instruction Cycle, Interrupts, Interconnection Structures, Bus Interconnection, Peripheral Component Interconnection (PCI).</p> <p>Memory Organization: Classifications of primary and secondary memories. Types of RAM (SRAM, DRAM, SDRAM, DDR, SSD) and ROM, Characteristics of memory, Memory hierarchy: cost and performance measurement.</p> <p>Cache Memory: Principles, Elements of cache design (Size, Mapping, Replacement, Write policies, Block size) Virtual Memory Concept.</p>
Module 2 (Credit 1)	
Learning Outcomes	<ol style="list-style-type: none"> 1. After learning the module, learners will be able to 2. Learn CPU. 3. Learn RISC.
Content Outline	<p>Input/Output: External devices, I/O Modules, Programmed I/O, Interrupted-Driven I/O, Direct Memory Access.</p> <p>Central Processing Unit: Instruction sets: Instruction characteristics, Types of operands, Types of operations on operands, addressing modes of 8086 processor, Processor Organization, Register organization.</p> <p>RISC: Instruction Execution, RISC Characteristics, and RISC Pipelining, RISC Vs. CISC, Reduced Instruction Set Computers (RISCs), Introduction to CISC. CISC Characteristics</p>

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

2. Assign Regular Problems that covers Various topics of Computer Organization Architecture
2. – Assign various activities of Computer Organization Architecture

Text Books:

1. William Stallings, Computer Organization and Architecture: Designing for Performance, Pearson Publication, 10th Edition, 2013
2. John P. Hayes, Computer Architecture and Organization, McGraw-Hill, 1988
3. Douglas V. Hall, “Microprocessor and Interfacing”, Tata McGraw-Hill 2 nd Edition
4. Barry B. Brey, “The Intel Microprocessors 8086/8088...”, PHI, 4 th Edition

Reference Books:

1. Andrew S. Tanenbaum Structured Computer Organization, Pearson, Sixth Edition
2. Morris Mano. Computer System Architecture Pearson Publication, 3rd Edition, 2007
3. Kai Hwang, Faye Alaye Briggs. Computer architecture and parallel processing, McGraw-Hill
4. P. Pal Chaudhuri. Computer Organization and Design Prentice Hall India, 2004
5. Dr. M. Usha, T.S. Shrikant. Computer System Architecture and Organization Wiley India, 2014.

Course Syllabus

Semester: II

2.3 Minor Stream- Mathematics I - Discrete Mathematics

Course Syllabus

Semester: II

2.4 OEC- Object Oriented Programming Using C++ (Theory)

Course Title	Object Oriented Programming Using C++ (Theory)
Course Credits	Credit: 02
Course Outcomes	<ol style="list-style-type: none">1. To understand how C++ improves C with object-oriented features.2. To learn how to implement copy constructors and class member functions, To understand the concept of data abstraction and encapsulation.3. To learn how to overload functions and operators in C++.4. To learn how inheritance and virtual functions implement dynamic binding with polymorphism.5. To learn how to design and implement generic classes with C++ templates.

Module 1 (Credit 1)	
Learning Outcomes	<p>After learning the module, learners will be able to</p> <ol style="list-style-type: none"> 1. Apply the concepts of object oriented programming. 2. Analyze a problem and construct a C++ program that solves it
Content Outline	<p>Evolution of OOP: Advantages and disadvantages of OOP over its predecessor paradigms.</p> <p>Basics of Object Oriented Programming: Abstraction, Encapsulation, Data hiding, Inheritance, Polymorphism, Code Extensibility and Reusability, User defined Data Types.</p> <p>C++ Program Structure, Simple Input/Output Program Program Comments, Operators in C++, Control Structures in C++</p> <p>Object and Classes : Core object concepts Encapsulation, Abstraction, Polymorphism Classes, Messages Association</p> <p>Interfaces Implementation of class in C++, C++ Objects as physical object, C++ object as data types constructor. Object as function arguments.</p> <p>Functions and Variables Functions: Declaration and Definition Variables: Definition, Declaration, and Scope Dynamic Creation and Derived Data Arrays and Strings in C++</p>
Module 2 (Credit 1)	
Learning Outcomes	<p>After learning the module, learners will be able to</p> <ol style="list-style-type: none"> 2. Learn Inheritance Constructor 2. Learn Polymorphism.
Content Outline	<p>Inheritance Concept of inheritance Derived class and based class Types of inheritance Classes within classes Functions and Friend Functions</p> <p>Constructors</p>

	<p>Multiple Constructors and Initialization Using Destructors to Destroy Instances</p> <p>Polymorphism Syntax for Operator overloading Overloading unary operations. Overloading binary operators Data conversion Pitfalls of operators overloading and conversion keywords.</p> <p>Memory management New and Delete Pointers to objects Debugging pointers.</p> <p>Exception Handling: try throw and catch constructs rethrowing an exception Catch all Handlers.</p>
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Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

3. Assign Programs of basic Concept in OOP

Text Books:

1. E. Balguruswamy, ‘Object Oriented Programming with C++’, Tata McGraw – Hill Education, 2008.
4. K.R Venugopal ‘Mastering C++’, Tata McGraw-Hill Education, 1997

Reference Books:

1. B.Stroustrup ‘C++ Programming Language’ (3rd Edition). Addison Wesley, 1997
2. B.chandraNarosa ‘A Treatise On Object Oriented programming using C++’- Publications, 1998
3. Herbert Schildt, “The Complete Reference CN”, Tata McGraw-Hili, 2001

Course Syllabus

Semester: I

2.4 OEC- Object Oriented Programming Using C++ Lab

Course Title	Object Oriented Programming Using C++ Lab
Course Credits	Course Credit:2

Course Outcomes	<p>a) Identify and practice the object-oriented programming concepts and techniques</p> <p>b) Practice the use of C++ classes and class libraries, arrays, vectors, inheritance and file I/O stream concepts.</p>
Module 1 (Credit 1)	
Learning Outcomes	<p>After learning the module, learners will be able to</p> <ol style="list-style-type: none"> 1. Create simple programs using classes and objects in C++ 2. Simple programs using functions and variables.
Content Outline	<p>Operators and decision control structures: Programs to implement if statements, Switch statements, Loop statements, Functions in C++: Main function, function proto type, Call by reference, return by reference, Inline functions, Default arguments, Const Arguments, Function overloading.</p> <p>Objects and Classes: Classes and Object, Programs for memory allocation for objects, Arrays of objects, Returning objects, Const Member functions, Pointers to members.</p> <p>Functions and Variables: Programs to implement Defining a function, declaration and calling a function, function arguments, Default values for parameters, friend function, Dynamic creation and derived data and use of arrays and strings with functions.</p> <p>Memory Management : Programs on memory management using new and delete and pointers to objects</p>
Module 2 (Credit 1)	
Learning Outcomes	<p>After learning the module, learners will be able to</p> <ol style="list-style-type: none"> 3. Implement Object Oriented Programming Concepts in C++ using inheritance, constructor and destructor 4. Implement Object Oriented Programs using polymorphism and exceptional handling.
Content Outline	<p>Inheritance : Programs for Inheritance Single, Multiple, Multilevel, Hierarchical inheritance, Hybrid inheritance, Virtual base class, Abstract class, Constructors in derived classes, Nesting of classes.</p> <p>Constructors and Destructors : Implementations of Constructors(Parameterized Constructors, Multiple constructors in a class, Constructors with default arguments, Copy constructors, Dynamic constructors)Destructors</p> <p>Polymorphism: Programs for Operator Overloading (Unary, Binary, Using friend functions etc.)</p> <p>Exception Handling: Implementations of try, catch and throw statement for handling the exceptions.</p>

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Programs on basic concepts of OOP's.

Text Books:

1. E. Balguruswamy, 'Object Oriented Programming with C++', Tata McGraw – Hill Education, 2008
2. K.R Venugopal 'Mastering C++', Tata McGraw-Hill Education, 1997

References:-

1. B.Stroustrup 'C++ Programming Language' (3rd Edition). Addison Wesley, 1997
2. B.chandraNarosa 'A Treatise On Object Oriented programming using C++'- Publications, 1998
3. Herbert Schildt, "The Complete Reference CN", Tata McGraw-Hili, 2001

Course Syllabus**Semester: II****2.5 SEC**

Course Title	Linux Operating System Lab
Course Credits	Course Credit:2
Course Outcomes	<ol style="list-style-type: none"> 1. Familiarize students with the Linux environment. 2. Understand the basic commands of linux operating system and can write shell scripts. 3. Create file systems and directories and operate those using programs. 4. effective use of a wide range of standard Linux programming and development tools.
Module 1 (Credit 1)	
Learning Outcomes	<p>After learning the module, learners will be able to</p> <ol style="list-style-type: none"> 3. Basic Linux commands 4. Learn the importance of Linux architecture along with features. 5. Identify and use Linux utilities to create and manage simple file processing operations. 6. Illustrate memory management of file handling through file/region lock.
Content Outline	<p>Introduction to Linux Introduction to Unix architecture, General-purpose utilities All basic commands introduction. Usage of commands. Files and Directories: File Concept, File types, File System Structure, File metadata- Inodes, kernel support for files, file System calls for file I/O operations- open, create, read, write, close. Directories- mkdir, rmdir, chdir, obtaining current working directorygetcwd, directory contents, scanning directories- opendir, readdir, closedir, rewind dir functions.</p>

Module 2 (Credit 1)	
Learning Outcomes	After learning the module, learners will be able to <ol style="list-style-type: none"> 1. Understand concept of filters in Linux 2. Understanding of editors 3. Develop shell scripts to perform more complex tasks in shell programming environment 4. Understanding of kernel.3.
Content Outline	<p>The vi Editor- Introduction to the vi editor of Linux.all commands.</p> <p>Introduction to filters- Simple Filters, Filters using regular expressions - use of grep command</p> <p>Introduction to shell concept and writing shell script- What is kernel, What is Shell,what is terminal,Advantage and disadvantage, first simple Shell Programme.</p>

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Assigning Assignments based on Commands.
2. Arranging code competition to Perform deferent operations on Linux.
3. Arranging Quiz competition based on commands.

Text/References:-

1. The Linux Kernel Book Rem Card, Eric Dumas and Frank Mevel Wiley Publications sons, 2003
2. Unix Concepts and Applications by Sumitabha Das, Fourth Edition, TMH, 2017
3. MySQL Bible Steve Suehring John Wiley sons, 2002
4. Programming PHP Rasmus Lerdorf and Levin Tatroe O'Reilly Publications, 2002
5. Terry Collings, Kurt Wall, "Red Hat Linux Network and System Administration" 3rd edition Wiley.
6. Neil Mathews, "Beginning Linux Programming" 4th edition, Wrox Press, 2007
7. P.Koparkar, "Unix For You", Tata McGraw-Hill, 2001
8. Y.P.Kanetkar, "Unix Shell programming", BPB publications , 1st Edition 2013.

Course Syllabus

Semester: II

2.6 - Swayam/Chetana/MOOC/ Or

Course Title	Principles & Practices of Accounting
Course Credits	Credit: 02

Course Outcomes	<ol style="list-style-type: none"> 1. Students will be able to learn fundamental accounting concepts, Conventions & terminologies. 2. The objective of the course is to strengthen the fundamentals of accounting and provide strong foundation for other accounting courses. 3. It will be demonstrated how a practical understanding and interpretation of accounting reports and other accounting tools can improve decision-making in the organization.
Module 1 (Credit 1)	
Learning Outcomes	<ol style="list-style-type: none"> 1. After learning the module, learners will be able to 2. Learn accounting and understanding basics concepts of accounting to final account. 3. Learn accounting and understanding basics concepts of Journal, ledger
Content Outline	<p>Introduction to Book – Keeping & Accountancy Accounting Terminologies, Accounting Principles, Basic Concepts, Double Entry Book – keeping System, Types of Vouchers & Specimen of Vouchers.</p> <p>Journal: Meaning, Importance and Utility of Journal Specimen of Journal ; Writing of Journal Entries on the basis of vouchers</p> <p>Ledger Meaning, Need and Specimen of Ledger Posting of Entries from Journal to Ledger.</p>
Module 2 (Credit 1)	
Learning Outcomes	<p>After learning the module, learners will be able to</p> <ol style="list-style-type: none"> 1. Learn accounting and understanding Subsidiary books 2. Learn accounting and understanding basics concepts of Bank
Content Outline	<p>Subsidiary Books Meaning, Need and Types of Subsidiary Books, Purchase Book, Sales Book, Purchase Return Book, Sales Return Book, Simple Cash Book with Only Cash Column, Cash Book with Cash and Discount Columns, Cash Book with Cash, Bank and Discount Columns & Analytical Petty Cash Book.</p> <p>Bank Reconciliation Statement:- Importance, Types Trial Balance and Rectification of Errors:- Objective, Preparation of Trial Balance</p> <p>Final Accounts: Trading and Profit & Loss Account, Balance Sheet</p>

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

5. Assign Regular Problems that covers Various topics of accountancy
2. – Assign various activities of journal, ledger.

REFERENCES:

1. Fundamentals of Accounting, Kalyani Publishers, S P Jain and K L Narang 2017.
2. Fundamentals of Accounting, Universal Publications, B S Raman, 2017
3. Accounting for Managers, Himalaya Publishing House, R Venkata Raman and Srinivas, 2017
4. S.N. Maheshwari & S.K. Gupta “Introduction to Accounting” 2016

Course Syllabus

Semester: II

2.7 AEC - Technical Writing

Course Title	Technical Writing
Course Credits	2 Credit
Course Outcomes	CO1: Understand the process of Technical Writing CO2: Understand Various User Guides CO3: Aware about the concepts of Translation and Localization CO4: Aware about the Working environment required for technical writing CO5: Writing Project Proposal, Software Project Documentation and Report writin
Module 1 (Credit 1)	
Learning Outcomes	Student will be able to 1. Learn Meaning of Technical Communication, its need and importance. 2. Learn process of Technical writing 3. Learn various user guides
Content Outline	1. Technical Communication ➤ Definition of Technical Communication ➤ Need for Technical Communication ➤ Importance of Technical Communication ➤ Attributes of Technical Communication 2. Role of Technical Author 3. Process of Technical Writing 4. Technical Publications

	<ul style="list-style-type: none"> ➤ User guides ➤ Administering guides ➤ Deployment guides ➤ Installation guides ➤ Implementation guides ➤ Troubleshooting guides
Module 2 (Credit 1)	
Learning Outcomes	Student will be able to <ol style="list-style-type: none"> 1. Learn Objectives , components of Technical leaflets 2. Learn Technical Processes and Procedures
Content Outline	<ol style="list-style-type: none"> 1. Technical Leaflets <ul style="list-style-type: none"> ➤ Objectives ➤ Components of Technical Leaflets ➤ Preparing Technical Leaflets 2. Technical Specifications & Descriptions <ul style="list-style-type: none"> ➤ Requirement Specifications ➤ Functional Specifications ➤ Design Specifications ➤ Test Specifications ➤ Writing Technical Descriptions ➤ Writing Processes and Procedures

Assignments :

- 1) To prepare Technical leaflets
- 2) To prepare various user guides

References /Text Books :

1. Technical Writing – Process and Product by Sharon T. Gerson & Steven M. Gerson, Pearson Education Inc.
2. Technical Writing and Profession by Thomas N. Huckin & Leslie A. Olsen, Macmillan
3. Writing and Life by Don Knepfel, CBS College Publishing
4. Business Correspondence and Report Writing by R.C. Sharma & Krishna Mohan 3rd Edition Tata McGraw-Hill
5. Beginner’s Guide to Technical Writing by John Evans
6. Thirty Minutes before presentation by Patrick Forsyth, Kogan Page India Pvt Ltd.
7. Writing and Analyzing effective Computer System Documentation by Ann Stuart , University of Evansville, Indiana
8. How to write a Computer Manual -A Handbook of Software Documentation by Jonathan Price, The Benjamin-Cummings Publishing Company, California
9. Technical Documentation by A. J. Marlow, NCC Blackwell
10. The Elements of Style by William Strunk Jr.
11. Technical Writing for Dummies by Sheryl Lindsell-Roberts
12. Technical Communication, 9th edition by Mike Markel
13. The Insider’s Guide to Technical Writing by Krista Van Laan
14. Technical Writer Career Guide by ClickHelp
15. Microsoft Manual of Style

Syllabus

Semester: II

2.8 VEC- Nutrition and Dietetics

Course Title	Nutrition and Dietetics
Course Credits	2 Credit
Course Outcomes	CO1: Understand the inter-relationship between food, nutrition and health CO2: Learn to relate foods with their nutrient content CO3: Know the methods and principles involved in cooking.
Module 1 (Credit 1)	
Learning Outcomes	1. Know nutritional aspects of foods and their functions. 2. Understand the importance and role of macronutrients in health 3. Identify food sources
Content Outline	Introduction to Nutrition 1: Terms used in Nutrition and Health. Definitions - Health, Nutrition, Nutrients, Foods, Diet, R.D.A., Balanced diet, Malnutrition, Under nutrition, Over nutrition, Optimum nutrition. 2: Five Food Groups and Food guide, relationship between food and nutrition, functions of food, classification of nutrients, factors affecting food consumption and food acceptance. Macronutrients 1. Carbohydrates 2. Proteins 3. Fats 4. Water
Module 2 (Credit 1)	
Learning Outcomes	1. Understand the concept of portion size 2. Know the specified amounts and proportion of ingredients used in the recipe
Content Outline	Basics of Food Preparation Cereal, pulse, milk, egg and vegetable and fruit preparation - Weights and measures - Standardization, portion size - Methods of food preparation - Food Science principles - Calculation of nutrients - Conservation of nutrients

References:

1. Mudambi, S.R. and Rajgopal, M.V. (2012), Fundamentals of Foods and Nutrition New Age

International Pvt. Ltd.

2. Food Science 1st Edition (2012) Sheth Publications. Maharashtra State Board of Secondary and Higher Secondary education Pune.
3. Roday S. (2012) Food Science and Nutrition (2nd Ed.) Oxford University Press.
4. Joshi S. (2009) Nutrition and Dietetics Mcgraw Hill Higher Education

2.9 * Co-curricular Course