परिपत्रक - UG (1) ST

॥ सा विद्या या विमुक्तये ॥

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

'ज्ञानतीर्थ', विष्णुपुरी, नांदेड – ४३१ ६०६ (महाराष्ट्र राज्य) भारत

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

'Dnyanteerth', Vishnupuri, Nanded - 431 606 (Maharashtra State) INDIA

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

Established on 17th September, 1994, Recognized By the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'B++' grade

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विज्ञान व तंत्रज्ञान विद्याशाखे अंतर्गत राष्ट्रीय शैक्षणिक धोरण २०२० नुसार पदवी प्रथम वर्षाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२४–२५ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, या विद्यापीठा अंतर्गत येणा–या सर्व संलग्नित महाविद्यालयामध्ये शैक्षणिक वर्ष २०२४–२५ पासून पदवीस्तरावर राष्ट्रीय शैक्षणिक धोरण –२०२० लागू करण्याच्या दृष्टीकोनातून विज्ञान व तंत्रज्ञान विद्याशाखे अंतर्गत येणा–या अभ्यासमंडळांनी तयार केलेल्या पदवी प्रथम वर्षाचे अभ्यासक्रमांना मा. विद्यापरिषदेने दिनांक १५ मे २०२४ रोजी संपन्न झालेल्या बैठकीतील विषय क्रमांक १५/५९–२०२४ च्या ठरावाअन्वये मान्यता प्रदान केली आहे. त्यानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील खालील बी. एस्सी प्रथम वर्षाचे अभ्यासक्रम (Syllabus) लागू करण्यात येत आहेत.

1) B. Sc. I year - Botany
2) B. Sc. I year - Seed Technology
3) B. Sc. I year - Horticulture
4) B. Sc. I year - Geology
5) B. Sc. I year - Dairy Science
6) B. Sc. I year -Electronics
7) B. Sc. I year - Environmental Science
8) B. Sc. I year - Fishery Science
9) B. Sc. I year - Mathematics
10) B. Sc. I year - Microbiology
11) B. Sc. I year - Agricultural Microbiology
12) B. Sc. I year - Physics
13) B. Sc. I year - Food Science
14) B. Sc. I year – Computer Science (N M D College Hingoli)

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या **www.srtmun.ac.in** या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी, ही विनंती.

डॉ. सरिता लोसरवार
सहा.कुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.:शै–१/एनइपी/विवत्रंविपदवी/२०२४–२५/९१२
दिनांक १२.०६.२०२४

प्रत : १) मा. आधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मुल्यमापन मंडळ, प्रस्तुत विद्यापीठ.
३) मा. प्राचार्य, सर्व संबधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
४) मा. संचालक, सर्व संकुले परिसर व उपपरिसर, प्रस्तुत विद्यापीठ
५) मा. प्राचार्य, न्यू मॉडल डिग्री कॉलेज हिंगोली.
६) सिस्टीम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. याना देवून कळविण्यात येते की, सदर परिपत्रक संकेतस्थळावर प्रसिध्द करण्यात यावे.

SWAMI RAMANAND TEERTH

MARATHWADA UNIVERSITY, NANDED - 431 606 (MS)

(**Structure and Syllabus of Four Years Multidisciplinary Degree Program with Multiple Entry and Exit Option**)

FOUR YEAR BACHELOR OF SCIENCE

COMPUTER SCIENCE

Under the Faculty of Science and Technology

(Revised as per the Govt. of Maharashtra circular dt. 13th March 2024)

Effective from Academic year **2024 – 2025**

(As per NEP-2020)

Details of the Board of Studies Members in the subject Computer Science under the faculty of Science & Technology of S.R.T.M. University, Nanded

Sr. No.	Name of the Member	Designation	Sr. No	Name of the Member	Designation
1	Prof. Girish V. Chowdhary Professor School of Comp. Sci., S.R.T.M.University, Nanded. Mobile-9421452364 E-Mail- girish.chowdhary@gmail.com	Chairman	7	Dr. Ravindra S. Hegadi Associate Professor Department of Computer science Central university of Karnataka . Kadaganchi , Kalaburagi Mobile 94408023871, E-Mail rshegadi@gmail.com,	Member
2	Dr. Santosh D Khamitkar Professor School of Comp. Sci., S.R.T.M.University, Nanded. Mobile-9421458081 EMail-s_khamitkar@yahoo.com	Member	8	Dr. N. P. Bhosale Department of Computer Science Indira Gandhi National Tribul University, Amarkantak-484887, Madyapradesh.	Member
3	Dr. Vikash Tukaram Humbe Assistant Professor School of Technology., S.R.T.M.University, Sub Campous Ausa Road Peth Latur. 415531 Mobile-9326792524 EMail-vikashhumbe@gmail.com	Member	9	Dr. (Mrs.) Maya Ingle Department of Computer Science Indore Institute of Science and Technology, Opp. I.I.M. Pithampur Road, Rau, Indore-453331, M.P.	Member
4	Dr. Mahendra Pundlikrao Dhore Principal Shivaji Science Nagpur 440012 Mobile-9423103043 Email-mpdhore@rediffmail.com	Member	10	Mr.Kaiwalya Katyarmak Manager, Cognizant's Quality Assurance and Engineering Group , Pune	Member
5	Dr. R. R. Manza Associate Professor Department of Computer Science and Information Technology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. Mobile- 9421308853 Email- manzaramesh@gmail.com	Member	11	Mr. Sanjay S. Kurundkar Copgemini India Pvt Ltd.Sr. Manager FSGBU Global Testing Practice Core Team Member	Member
6	Dr. Mohammad Atique Mohammad Junaid. Professor Department of Computer Science & Engineering , Sant Gadge Baba Amravati University Amravati-44602 Mobile: 09823724560 E-mail: mohammadatique@sgbau.ac.in	Member			Member
INVITEE MEMBER					
12	Dr. Premal B. Nirpal Assistant Professor Department of Computer Science S.R.T.M.University, Nanded's New Model Degree College, Hingoli-431513 Mobile: 8055144201 Mail: premal.nirpal@gmail.com	Member			

From the Desk of the Dean, Faculty of Science and Technology

Swami Ramanand Teerth Marathwada University, Nanded, enduring to its vision statement "***Enlightened Student: A Source of Immense Power",*** is trying hard consistently to enrich the quality of science education in its jurisdiction by implementing several quality initiatives. Revision and updating curriculum to meet the standard of the courses at national and international level, implementing innovative methods of teaching-learning, improvisation in the examination and evaluation processes are some of the important measures that enabled the University to achieve the **3Es, the** ***equity, the efficiency and the excellence*** in higher education of this region. To overcome the difficulty of comparing the performances of the graduating students and also to provide mobility to them to join other institutions the University has adopted the *cumulative grade point average* (CGPA) system in the year 2014-2015. Further, following the suggestions by the UGC and looking at the better employability, entrepreneurship possibilities and to enhance the latent skills of the stakeholders the University has adopted the *Choice Based Credit System* (CBCS) in the year 2018-2019 at graduate and post-graduate level. This provided flexibility to the students to choose courses of their own interests. To encourage the students to opt the world-class courses offered on the online platforms like, NPTEL, SWAYM, and other MOOCS platforms the University has implemented the credit transfer policy approved by its Academic Council and also has made a provision of reimbursing registration fees of the successful students completing such courses.

SRTM University has been producing a good number of high caliber graduates; however, it is necessary to ensure that our aspiring students are able to pursue the right education. Like the engineering students, the youngsters pursuing science education need to be equipped and trained as per the requirements of the R&D institutes and industries. This would become possible only when the students undergo studies with an updated and evolving curriculum to match global scenario.

Higher education is a dynamic process and in the present era the stakeholders need to be educated and trained in view of the self-employment and self-sustaining skills like start-ups. Revision of the curriculum alone is not the measure for bringing reforms in the higher education, but invite several other initiatives. Establishing industry-institute linkages and initiating internship, on job training for the graduates in reputed industries are some of the important steps that the University would like to take in the coming time. As a result, revision of the curriculum was the need of the hour and such an opportunity was provided by the New Education Policy 2020. National Education Policy 2020 (NEP 2020) aims at equipping students with knowledge, skills, values, leadership qualities and initiates them for lifelong learning. As a result the students will acquire expertise in specialized areas of interest, kindle their intellectual curiosity and scientific temper, and create imaginative individuals.

The curriculum given in this document has been developed following the guidelines of NEP-2020 and is crucial as well as challenging due to the reason that it is a transition from general science-based to the

discipline-specific-based curriculum. All the recommendations of the ***Sukanu Samiti*** given in the **NEP Curriculum Framework-2023** have been followed, keeping the disciplinary approach with rigor and depth, appropriate to the comprehension level of learners. All the Board of Studies (BoS) under the Faculty of Science and Technology of this university have put in their tremendous efforts in making this curriculum of international standard. They have taken care of maintaining logical sequencing of the subject matter with proper placement of concepts with their linkages for better understanding of the students. We take this opportunity to congratulate the Chairman(s) and all the members of various Boards of Studies for their immense contributions in preparing the revised curriculum for the benefits of the stakeholders in line with the guidelines of the Government of Maharashtra regarding NEP-2020. We also acknowledge the suggestions and contributions of the academic and industry experts of various disciplines.

We are sure that the adoption of the revised curriculum will be advantageous for the students to enhance their skills and employability. Introduction of the mandatory ***On Job Training, Internship*** program for science background students is praise worthy and certainly help the students to imbibe first-hand work experience, team work management. These initiatives will also help the students to inculcate the workmanship spirit and explore the possibilities of setting up of their own enterprises.

Dr. M. K. Patil
Dean
Faculty of Science and Technology

Swami Ramanand Teerth Marathwada University's

New Model Degree College, Hingoli

Syllabus for B. Sc. (CS) I year I Semester

SBCSCT3101: *Programming in C*

Course pre-requisite:

A basic understanding of computer programming terminologies

Course objectives:

- To be able to build own logic for a given problem and finally develop one's own programs
- To understand the syntax and the semantics of C programming language.

Course outcomes:

- After completing this course satisfactorily, a student will be able to:

1. Written in C language
2. Write the C code for a given problem
3. Perform input and output operations using programs in C
4. Write programs that perform operations on arrays

Curriculum Details

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		**Unit I**	
	1.1	Introduction: What is C, Getting Started with C ,The C Character Set, Constants, Variables and Keywords, Types of C Constants ,Rules for Constructing Integer Constants, Rules for Constructing Real Constants, Rules for Constructing Character Constants, Types of C Variables, Rules for Constructing Variable Names, C Keywords,	**8**
	1.2	The First C Program, Compilation and Execution, Receiving Input, C Instructions, Type Declaration Instruction, Arithmetic Instruction, Integer and Float Conversions,	
	1.3	Type Conversion in Assignments, Hierarchy of Operations, Associativity of Operators, Control Instructions in C.	
2.0		**Unit II**	
	2.1	The Decision Control Structure: Decisions, The if Statement, The Real Thing, Multiple, Statements within if , The if-else Statement, Nested if-elses, Forms of if , Use of Logical Operators, The else if Clause, The ! Operator,	**8**

		Hierarchy of Operators Revisited, A Word of Caution, The Conditional Operators, Decisions Using switch, The Tips and Traps, switch Versus if-else Ladder, The goto Keyword	
	2.2	The Loop Control Structure : Loops, The while Loop, Tips and Traps, More Operators, The for Loop, Nesting of Loops, Multiple Initializations in the for Loop, The Odd Loop, The break Statement, The continue Statement, The do-while Loop.	
3.0		**Unit III**	
	3.1	Functions & Pointers: What is a Function, Why Use Functions, Passing Values between Functions, Scope Rule of Functions, Calling Convention, One Dicey Issue, Advanced Features of Functions, Function Declaration and Prototypes, Call by Value and Call by Reference,	**8**
	3.2	Pointers: An Introduction to Pointers, Pointer Notation, Back to Function Calls, Conclusions, Recursion, Recursion and Stack, Adding Functions to the Library.	
4.0		**Unit IV**	
	4.1	**Arrays:** What are Arrays, Array Initialization, Bounds Checking, Passing Array Elements to a Function, Pointers and Arrays, Passing an Entire Array to a Function,	**6**
	4.2	Two Dimensional Arrays, Initializing a 2-Dimensional Array, Memory Map of a 2-Dimensional Array, Pointers and 2-Dimensional Arrays, Pointer to an Array Passing 2-D array to a Function, Array of Pointers, Three Dimensional Array.	
		Total	**30**

Reference Books:

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

SBCSCP3102: *Programming in C (Practical)*

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0			**20**
	1.1	1. Demonstrate C programming Structure 2. Use of data types, initialization 3. Use of control statements 4. Use of looping statements 5. Demonstrate input output statements 6. Use of array 7. Demonstrate string library function 8. Use of c programs to solve some arithmetical and logical problems	
2.0			**05**
	2.1	Creation: Project report preparation based	
3.0			**05**
	3.1	Self Evaluation: Based on checklist provided by instructor.	
		Total	**30**

SBCSMT3101: *Information Communication Technology*

Course pre-requisite:

A basic knowledge of computer

Course objectives:

- The objective of this course is to study the fundamentals of Computer System and to learn how computer systems work and underlying principles

Course outcomes:

- After completing this course satisfactorily, a student will be able to:
  1. Operate desktop computers to carry out computational tasks
  2. Understand working of hardware and software and the importance of operating systems
  3. Understand programming languages, number systems, peripheral devices, networking,
  4. Multimedia and internet concepts Read, understand and trace the execution of programs

Curriculum Details

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		**Unit I**	**8**
	1.1	Introduction: Definition of Computer, Characteristics of Computer, Computer Generation	
	1.2	Basic Computer Organization: Block Diagram, Input Unit, Output Unit, Storage Unit, Arithmetic Unit, Control Unit, Central Processing Unit, the System Concept.	
	1.3	Number Systems: Non-Positional Number Systems, Positional Number Systems: Binary, Octal, Decimal, Hexadecimal. Conversion from one number system to another number system.	
2.0		**Unit II**	**8**
	2.1	Computer Codes: BCD, EBCDIC, ASCII, UNICODE, Collecting Sequence.	
	2.2	Main Memory: Storage Evolution criteria, Main Memory Organization, Main Memory Capacity, Types of Memory Chips, Cache Memory.	
	2.3	Secondary Memory: Sequential and Direct Access Devices, Magnetic Taps, Magnetic Chips, Optical Disks, Memory Storage Devices (Pen Drives, SD/MMC)	
3.0		**Unit III**	**8**
	3.1	Input Devices: Keyboard, Point-and-draw devices, Data scanning devices, Digitizer, Electronic Card Reader, Speech Recognition Devices, and Vision input devices.	
	3.2	Output Devices: Monitor, Printers, Plotter, Screen image projectors, Voice response systems.	
4.0		**Unit IV**	**6**
	4.1	Computer Software: Software, Relationship between	

		Hardware and Software, Types of Software.	
	4.2	Internet: Definition, History, Basic Services (E-mail, FTP, Telnet, Usenet News), WWW, Search Engine, Use of Internet.	
		Total	**30**

Reference Books:

1. P.K. Sinha & Priti Sinha “Computer Fundamentals” (Sixth Edition),
2. P.K. Sinha “Foundation of Computer”.

SBCSMP3102: *Web Programming Using HTML (Practical)*

Course pre-requisite:

Basic knowledge of computer fundamental and the ability to work with files

Course objectives:

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

Course outcomes:

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

1. Build websites using the elements of HTML.
2. Build dynamic websites using the client side programming techniques with CSS.
3. Learn to validate client-side data

Curriculum Details

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		**Unit I**	**8**
	1.1	Introduction to Web Designing, Web page, Website, Web browser, www, Developing web Documents-Web design process, and Publishing documents: Web publishing. Maintaining documents: maintenance phases of web page.	
	1.2	HTML Markup tags: Tags-Definition, Basic Tags, Paragraph Tags, List tags, Horizontal Rule Tag, Headings Tags, Block quote Tags, other different formatting tags.	
2.0		**Unit II**	**4**
	2.1	Linking in HTML: U.R.L. concept, Hyperlink (Anchor) Tag & it's all attributes, Creating Email Hyperlinks.	
	2.2	Images in HTML: Introduction: Image & image formats, <img> tag& it's all attributes, Inline & Floating Images, Using Images as links.	
3.0		**Unit III**	**8**
	3.1	Tables in HTML: Introduction, Table Tags:- TABLE, TR, TH, TD & all Attributes, Row span, Cols pan, Cell spacing, Cell padding, Table examples	

	3.2	Frames in HTML: Overview, FRAMESET & FRAME tags & its attributes, Simple frame Examples, Use of <noframe> tag, Frame targeting, Floating frames.	4
4.0		**Unit IV**	
	4.1	Forms in HTML: Introduction to forms, FORM tag& it's attributes (Action, Enctype, Method, Name), Simple form examples, Form controls: Text Field, Password Field, Multiline Text Area, Drop, Down List, Check Box, Radio Buttons, Scrolled List, Reset Button, Submit button.	**6**
		Total	**30**

Reference Books:

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

SBCSCT3101: *Data Structure*

Course pre-requisite:

Familiarity with fundamental computer science concepts such as algorithms, time complexity, and space complexity is crucial. A good understanding of a programming language is essential.

Course objectives:

- Students should develop a solid understanding of fundamental data structures like arrays, linked lists, stacks, queues, trees, and graphs.
- This involves knowing how these structures work, their advantages, and when to use them.

Course outcomes:

- After completing this course satisfactorily, a student will be able to:
  1. To learn how the choice of data structures impacts the performance of programs.
  2. To study specific data structures such as arrays, linear lists, stacks, queues, hash tables, binary trees, binary search trees, heaps and trees.
  3. To learn efficient searching and sorting techniques.

Curriculum Details

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		**UNIT I**	**8**
	1.1	The concept of data structure, Abstract data type, data structure operations, algorithms complexity, time-space trade off.	
	1.2	Introduction to strings, storing strings, string operations, pattern matching algorithms.	
2.0		**UNIT II**	**8**
	2.1	Linked list: Introduction and basic operations, Header nodes, Doubly Linked List, Circular Linked List, and Applications of Linked List.	
	2.2	Stack: primitive operation on stack, Representation of Stack as Linked List and array, Stacks applications.	
3.0		**UNIT III**	**8**
	3.1	Introduction to queues, Primitive Operations on the Queues, Circular queue, Priority queue, Representation of Queues as Linked List and array, Applications of queue.	
	3.2	Trees- Basic Terminology, Binary Trees, Tree Representations using Array & Linked List, Basic operation on Binary tree, Traversal of binary trees:- In	

		order, Pre order & post order, Applications of Binary tree.	
4.0		**UNIT IV**	**6**
	4.1	Introduction to graphs, Definition, Terminology, Directed, Undirected & Weighted graph, Representation of graphs.	
	4.2	Searching: linear search, Binary search, Sorting: Insertion sort, Selection sort, Quick sort, Bubble sort.	
		Total	**30**

Reference Books:

1. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgrraw-Hill International Student Edition, New York.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Addison- Wesley, (An Imprint Of Pearson Education), Mexico City.Prentice- Hall Of India Pvt. Ltd., New Delhi.

Text Books:

3. Seymour Lipschutz, "Data Structures", Tata McGraw- Hill Publishing Company Limited, Schaum's Outlines, New Delhi.
4. Yedidyan Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, "Data Structures Using C", Prentice Hall of India Pvt. Ltd., New Delhi.

SBCSCP3101: *Data Structure using C (Practical)*

Course pre-requisite:

- Basic Programming Skills: Understand variables, control structures, loops, functions, and arrays.
- C Programming Language: Proficiency in C syntax, pointers, memory management.
- Algorithmic Thinking: Familiarity with basic algorithms, searching, sorting, recursion, complexity analysis.

Course objectives:

- Understanding Data Structures: Gain a deep understanding of various data structures such as arrays, linked lists, stacks, queues, trees, and graphs.
- Implementation Proficiency: Learn how to implement these data structures efficiently in C, considering memory management and performance.
- Algorithmic Analysis: Understand the time and space complexity of different operations on data structures.
- Problem-Solving Skills: Develop problem-solving skills by applying data structures to solve real-world problems and algorithmic challenges.

Course outcomes:

- After completing this course satisfactorily, a student will be able to:
  1. Proficiency in Data Structure Implementation: Ability to implement various data structures in C from scratch.
  2. Algorithmic Understanding: Understand the underlying algorithms and operations associated with each data structure.
  3. Problem-Solving Aptitude: Gain proficiency in solving problems using data structures and algorithms.
  4. Code Optimization Skills: Learn techniques to optimize code for better performance and efficiency.To learn efficient searching and sorting techniques.

SBCSGE3101: *Introduction to Information Technology*

Course pre-requisite:

A basic knowledge of computer

Course objectives:

- This course aims at acquainting the students with basic ICT tools which help them in their day to day and life as well as in office and research.

Course outcomes:

- After completing this course satisfactorily, a student will be able to:
  1. Understand the literature of social networks and their properties.
  2. Explain which network is suitable for whom.
  3. Develop skills to use various social networking sites like twitter, flickr, etc.
  4. Learn few GOI digital initiatives in higher education.
  5. Apply skills to use online forums, docs, spreadsheets, etc for communication, collaboration

Curriculum Details

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		**UNIT I**	**8**
	1.1	Introduction: Definition of Computer, Characteristics of Computer, Basic Computer Organization: Block Diagram, Input Unit, Output Unit, Storage Unit, Arithmetic Unit, Control Unit, Central Processing Unit, the System Concept.	
	1.2	Main Memory, Secondary Memory: Sequential and Direct Access Devices, Magnetic Taps, Magnetic Chips, Optical Disks, Memory Storage Devices	
2.0		**UNIT II**	**8**
	2.1	E-mail: Definition of E-mail -Advantages and Disadvantages –User Ids, Passwords, Email Addresses, Domain Names, Mailers, Message Components, Message Composition, Mail Management.	
3.0		**UNIT III**	**8**
	3.1	Fundamentals of Internet: What is Internet?, Internet applications, Internet Addressing – Entering a Web Site Address, URL–Components of URL, Searching the Internet, Browser –Types of Browsers, Introduction to Social Networking: Twitter, LinkedIn, Facebook, Skype, YouTube, WhatsApp.	
4.0		**UNIT IV**	**6**
	4.2	What are GOI digital initiatives in higher education? (SWAYAM, Swayam Prabha, National Academic Depository, National Digital Library of India, E-Sodh-Sindhu, Virtual labs, eacharya, e-Yantra and NPTEL).	
		Total	**30**

Reference Books:

1. P.K. Sinha & Priti Sinha “Computer Fundamentals” (Sixth Edition),
2. Fundamentals of the Internet and the World Wide Web, 2/e – by Raymond Greenlaw and Ellen Hepp, Publishers : TMH
3. Internet technology and Web design, ISRD group, TMH.
4. Information Technology – The breaking wave, Dennis P.Curtin, Kim Foley, Kunai Sen and Cathleen Morin, TMH.

SBCSSC3101: *Office Automation*

Course pre-requisite:

Knowledge of reading and writing in English

Course objectives:

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

Course outcomes:

- On successful completion of this course, a student will be able to:

1. Create and refine documents using text formatting, tables and graphics.
2. Use mail merge.
3. Create macros and templates in documents.
4. Protect documents.
5. Create presentations containing transitions and animations. Learn advanced presentation features like custom slide show, call outs and action buttons.
6. Use referencing and functions for data handling.

Curriculum Details

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		**Unit I**	
	1.1	Introduction to Ms-Word: Uses of Ms- Word, Introduction to Ms-Word Windows: Title bar, Menu bar, Toolbar, Standard Toolbar, Formatting toolbar, The Ruler bar, Insertion point, Scroll Bars, The status bar, Dialog Boxes: Command buttons, check boxes, Drop-down lists, tabs, radio Buttons, Increment buttons, Wizards and Templates, Basic Text Editing: Cut, Copy, Paste, Undo, Redo, Delete	**8**
2.0		**Unit II**	
	2.1	Formatting: Character formatting by using Font dialog box, Paragraph Formatting by using Keeping text together, Adding borders and shading, page and section formatting, page setup, Numbering pages.	**8**

3.0		**Unit III**	
	3.1	Working with Tables and Columns: History of table, creating a table, entering text in a table using table tools, Changing column's width with Auto fit, Gridlines, Merging Cells, Table Formatting:-Sorting tables, copying tables, deleting tables, Mail merge	**8**
	3.2	Introduction to Power point Creating PowerPoint Presentation.	
4.0		**Unit IV**	
	4.1	Introduction to Ms-Excel: Spreadsheet overview, starting excel, creating spreadsheet, excel menu, Working with Formulas and Functions: Introduction using basic formulae, advance formulae, designing formulae, Formatting: Types of formatting: 1. Using borders, color and patterns 2. Conditional formatting	**8**
	4.2	Introduction to MS-Access Creation Of files in Ms-Access.	
		Total	**32**

Reference Books:

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

Swami Ramanand Teerth Marathwada University's

New Model Degree College, Hingoli

Syllabus for B. Sc. (CS) I year II Semester

SBCSCT3151: *Object Oriented Programming with C++*

Course pre-requisite:

The basic functionality of computer programs

Course objectives:

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

Course outcomes:

- On successful completion of the course, students will be able to:

1. Write simple programs using built-in data types of C++.
2. Implement arrays and user defined functions in C++.
3. Write programs using dynamic memory allocation, handling external files, interrupts and exceptions.
4. Solve problems spanning multiple domains using suitable programming constructs in C++.
5. Solve problems spanning multiple domains using the concepts of object oriented programming in C++

Curriculum Details

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		**Unit I**	
	1.1	**Introduction to OOPs** Object Oriented Programming, Basic concepts of OOPS, Benefits of OOPs.	
	1.2	**Introduction to C ++** Tokens, Keywords, Identifiers, Constant, Data types, variables, Scope resolution Operator, I/O statements, Structure of C++ program, Control statements, Looping statements, Type casting, Arrays, Pointer, References,	**8**

		Structure and Unions	
2.0		**Unit II**	**8**
	2.1	**Function in C++** Call by reference, Return by reference**,** Function overloading and default arguments, Inline function, Static class members, Friend functions.	
	2.2	**Class & Object:** Define Class, Members, Object, Visibility Modes, Static members, Defining Data Members and Member Functions, Nested Classes, Local Classes, Pointer to members & Pointer to Objects, Constructors & Destructors	
3.0		**Unit III**	**8**
	3.1	**Operator overloading** Overloading Unary Operators, Overloading Binary Operators, Overloading using Friend Function, Rules for Overloading.	
4.0		**Unit IV**	**8**
	4.1	**Inheritance & Polymorphism:** Types of Inheritance with Examples, Virtual Base Classes and Abstract Base Classes, Polymorphism, Constructor and Destructor in Derived Class, Virtual Functions and Pure Virtual Function	
		Total	**32**

Reference Books:

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

SBCSCP3152: *OOPs with C++ (Practical)*

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0			**20**
	1.1	1. Demonstrate C++ programming Structure 2. Use of data types, initialization 3. Use of control statements 4. Use of looping statements 5. Demonstrate input output statements 6. Use of array 7. Demonstrate string library function 8. Use of C++ programs to solve some arithmetical and logical problems	
2.0			**05**
	2.1	Creation: Project report preparation based	
3.0			**05**
	3.1	Self Evaluation: Based on checklist provided by instructor.	
		Total	**30**

SBCSM3151: *RDBMS*

Course pre-requisite: Basic knowledge of working with computers

Course objectives:

To acquire basic conceptual background necessary to design and develop simple database system, Relational database mode, ER model and distributed databases, and to write good queries usinga standard query language called SQL

Course outcomes:

- On successful completion of the course, students will be able to:
  1. Describe basic concepts of database system
  2. Design a Data model and Schemas in RDBMS
  3. Competent in use of SQL
  4. Analyze functional dependencies for designing robust Database•

Curriculum Details

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		**Interactive SQL**	**8**
	1.1	Oracle & Client-Server Technology, DDL: Naming Rules and Conventions, Data types, Constraints, Creating Table, Displaying Table Information, Altering an Existing Table, Dropping a Table, Renaming a Table,	
	1.2	DML, DCL statements, DDL Commands : CREATE, ALTER, DROP for tables, DML Commands; SELECT, INSERT, DELETE and UPDATE	
2.0		**More on SQL**	**8**
	2.1	Computations on Table Data, Oracle Dual Table, Sysdate, Oracle Functions: Numeric function : ABS, MOD, FLOOR, CEIL, TRUNC, SQRT, SIGN, SIN, COS, LOG, EXP, LEAST, GREATEST Group functions: AVG, MAX, MIN, SUM, COUNT, Character function : LENGTH, LOWER, UPPER, INITCAP, INSTR, SUBSTR, LPAD, RPAD, LTRIM, RTRIB, DECODE, SOUNDEX, Conversion function: To-NUMBER, To-CHAR.	
	2.2	Data Constraints, Grouping Data from Tables, Manipulating Dates, Subqueries, Joins, Study of the clauses: Union, Intersect, Minus	
3.0		**SQL Performance Tuning**	**6**

	3.1	Indexes: too many indexes on a table, categories of Index based on uniqueness of Indexed column: Duplicate Index, Unique Index	
	3.2	Sequences: Increment by, Max value, min value, Cycle, no cycle, Insert Sequence, Alter Sequence, Drop Sequence Views: Update View, Insert View, Modify View, Delete View, Drop View.	
4.0		**Introduction to Pl/SQL:**	**8**
	4.1	Introduction, The Generic PL/SQL Block, Oracle Transaction,	
	4.2	Constants and variables, Data types, control structure,	
		Total	**30**

Reference Books:

1) Database System Concepts By Henry korth and A. Silberschatz
2) An Introduction to Database System by Bipin Desai

SBCSM3152: *SQL (Practical)*

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0			**20**
	1.1	1. Creating, altering, and dropping database objects 2. Inserting, updating, and deleting data. 3. Perform query more on SQL 4. Sorting query results 5. Performing joins between tables. 6. Understanding and creating indexes. 7. Implementing constraints (e.g., primary key, foreign key).	
2.0			**05**
	2.1	Creation: Project report preparation based	
3.0			**05**
	3.1	Self Evaluation: Based on checklist provided by instructor.	
		Total	**30**

SBCSMT3151: *Operating System*

Course pre-requisite:

A basic understanding of computer programming terminologies

Course objectives:

- To be able to build own logic for a given problem and finally develop one's own programs
- To understand the syntax and the semantics of C programming language.

Course outcomes:

- After completing this course satisfactorily, a student will be able to:

1. Written in C language
2. Write the C code for a given problem
3. Perform input and output operations using programs in C
4. Write programs that perform operations on arrays

Curriculum Details

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		**Introduction**	
	1.1	Introduction to Operating System, System Structures: Operating system services, system calls, system programs, Operating system design and implementation, Operating system structure.	**8**
2.0		**Process Management**	
	2.1	Process Management: Process Concept, Operations on processes, Process scheduling and algorithms, Inter-process Communication, Concepts on Thread and Process, Deadlocks: Deadlock detection, deadlock prevention, and deadlock avoidance fundamentals.	**8**
3.0		**Memory Management**	
	3.1	Memory Management Strategies: Swapping, Contiguous Memory Allocation, Paging, Segmentation, and Virtual Memory Management: Concepts, implementation (Demand Paging), Page Replacement, Thrashing.	**8**
4.0		**File Management**	
	4.1	I/O Management: I/O hardware, I/O Buffering, Disk I/O, Raid, Disk Cache.	

	4.2	Storage Management: File System concept, Access Methods, File System Mounting, File Sharing and File Protection, Implementing File Systems, Kernel I/O Systems.	**6**
	4.3	Protection Mechanisms: Cryptography, Digital Signature, User Authentication.	
		Total	**30**

Reference Books:

1. Operating System Concept – By Abraham & Peter B. Galvin (8th Edition)
2. Richard F Ashley, Linux with Operating System Concepts, Chapman and Hall/CRC Published August 26, 2014
3. Operating System – By Stuart Madnick & Donovan
4. Operating System Concept – By Achyut S Godbole (2nd Edition)
5. Operating System Concept – By William Stallings (4th Edition)

SBCSMP3152: *Operating System (Practical)*

Course pre-requisite:

- Basic Programming Skills: Understanding of variables, control structures, loops, functions, and data structures.
- C Programming Language: Proficiency in C programming, including pointers, memory management, and file handling.
- Computer Architecture: Basic knowledge of computer organization and architecture, including CPU, memory, and I/O devices.

Course objectives:

- Understanding Operating System Fundamentals: Gain a deep understanding of the fundamental concepts and components of operating systems.
- Hands-on Experience: Acquire practical experience in developing and implementing operating system components.
- System Programming Skills: Learn system-level programming techniques using C for interacting with the operating system.

Course outcomes:

- After completing this course satisfactorily, a student will be able to:
    1. Comprehensive Understanding: Develop a comprehensive understanding of operating system principles, including process management, memory management, file systems, and I/O operations.
    2. Practical Skills: Acquire practical skills in developing and implementing operating system components using C programming language.
    3. Problem-solving Abilities: Enhance problem-solving abilities for analyzing and solving issues related to operating system behavior and performance.
    4. System Optimization: Gain knowledge of techniques for optimizing system performance, including process scheduling algorithms, memory allocation strategies, and I/O optimizations.

SBCSGE3151: *Web Content Development*

Course pre-requisite:

1. Basic Knowledge of Computer

Course objectives:

- The primary objective of this course is gain proficiency in HTML, CSS, and JavaScript, the fundamental technologies used in web development.
- Develop the ability to plan and implement a content strategy aligned with organizational goals.
- Understand the importance of audience analysis and user personas in shaping effective content.

Course outcomes:

- On successful completion of the course, students will be able to:
- Describe the concepts of World Wide Web, and the requirements of effective web design.
- Develop web pages using the HTML and CSS features with different layouts as per need of applications.
- Use the JavaScript to develop the dynamic web pages. and graphics editor.

Curriculum Details

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		**Unit I**	
	1.1	Introduction to Internet and World Wide Web (WWW). Evolution and History of World Wide Web, Web Pages and Contents, Web Clients, Web Servers, Web Browsers. Hypertext Transfer Protocol, URLs. Searching and Web-Casting Techniques, Search Engines and Search Tools, Scripting Languages.	**6**
2.0		**Unit II**	
	2.1	Web Publishing: Hosting Web Site. Internet Service Provider. Planning and designing Web Site. Web Content Authoring, Web Graphics Design, Web Programming, Steps For Developing Web Site, Choosing the Contents, Home Page, Domain Names, Creating a Website and Markup Languages (HTML, DHTML).	**8**
3.0		**Unit III**	
	3.1	Web Development: HTML Document Features, HTML and XHTML, Standard XHTML Document Structure, Images, Headers, Text Styles, Text Structuring, Text Colors and Background, Formatting Text, Page Layouts. Hypertext Links, Syntactic Differences between HTML and XHTML. Overview and Features of HTML5.	**8**
4.0		**Unit IV**	
	4.1	Images. Ordered and Unordered lists, Inserting Graphics. Table Creation and Layouts, Frame Creation and Layouts, Working with Forms and Menus, Working with Radio Buttons, Check Boxes. Text Boxes. CSS: Introduction, Types of style sheets, Style specification formats, Font properties, List properties, Color, Alignment of text, Background images, The and tags, Features of CSS3.	**8**
		Total	**30**

Reference Books:

1. Ramesh Bangia, “Learning Desktop Publishing(DTP) Second Edition”, Khanna publishing
2. Kogent Learning Solutions Inc., Web Technologies Black Book, Dreamtech Press, 2009
3. Joel Sklar, Principles of Web Design, Cengage Learning, 6th Edition, 2015.

SBCSSC3151: *DTP & Multimedia*

Course pre-requisite:

Basic Knowledge of Computer

Course objectives:

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

Course outcomes:

- On successful completion of the course, students will be able to:
- Demonstrate safe working practices and utility of computer hardware components, installation of Operating System and other system software / Application Software.
- Create, edit, and format document/ graphics by using different word processing software and graphics editor.

Curriculum Details

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0			**10**
	1.1	Scope of the DTPO trade, Safety rules and safety signs, Types and working of fire extinguishers, Introduction to computer components, Introduction to computer system.	
	1.2	Concepts of hardware and software Function of motherboard components and various processors, Various Input/ Output devices in use and their features.	
2.0			**10**
	2.1	Introduction to the Word processing Software, Creating, saving and formatting and printing documents using Word,	
	2.2	Working with objects, macro, mail merge, templates and other tools in Word, Merits and demerits Word Processing Software	
3.0			**10**
	3.1	Create, format, edit and develop images using Adobe Photoshop software, Draw, edit, format and develop graphics design using Corel draw application software.	
		Total	**30**

Reference Books:

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