॥ 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

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 विद्याशाखेतील प्रस्तुत विद्यापीठ संचलित न्यु मॉडल डिग्री कॉलेज हिंगोली येथील पदवीस्तरावरील **B. Sc. Computer Science** प्रथम वर्ष अभ्यासक्रम शैक्षणिक वर्ष २०२३–२४ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, दिनांक १६ जून २०२३ रोजी संपन्न झालेल्या मा. विद्यापरिषदेच्या बैठकीतील ऐनवेळचा विषय क्र. ०४/५६–२०२३ अन्वये मान्यता दिल्यानुसार विज्ञान व तंत्रज्ञान विद्याशाखे अंतर्गत राष्ट्रीय शैक्षणिक धोरणानुसार खालील अभ्यासक्रम शैक्षणिक वर्ष २०२३–२४ पासून लागू करण्यात येत आहे.

1. B. Sc. Computer Science I year (New Model Degree 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.

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.:शैक्षणिक–१/परिपत्रक/एनईपीपीजी/
२०२३–२४/237

दिनांक : १८.०८.२०२३.

आपली विश्वासू

सहा.कुलसचिव

शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :

१) मा. अधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
३) मा. प्राचार्य, न्यु मॉडल डिग्री कॉलेज हिंगोली.
७) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. यानां देवून कळविण्यात येते की, सदरील परिपत्रक विद्यापीठाच्या संकेतस्थळावर प्रसिध्द करण्यात यावे.

SWAMI RAMANAND TEERTH
MARATHWADA UNIVERSITY, NANDED - 431 606

(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

Effective from Academic year **2023 – 2024**
(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, rshegadi@cuk.ac.in	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: primal.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, Nanded

Faculty of Science & Technology

Structure for Four Year Multidisciplinary Degree Program with Multiple Entry and Exit

Subject: COMPUTER SCIENCE

Year & Level	Semester	Subject-1 Major (DSC/DSE) 6 Credits	Subject-2 Minor (DSM) (Basket 1)	Generic Elective (GE) (Basket 2) *(Select one each from Group A and B of Basket 2, should not be related to DSC / DSM in col. 3 and 4)* 4 Credits	Vocational & Skill Enhancement Course (VSEC) *(Related to DSC)* 4 Credits	Ability Enhancement Course (AEC) (Basket 3 for L2) Value Education Courses (VEC) / Indian Knowledge System (IKS) *(Common across faculty)* 6 Credits / 04 credits	Field Work / Project/ Internship/ OJT/ Apprenticeship / Case Study Or Co-curricular Courses (CC) (Basket 4 for CC) *(Common across faculty)* 2 Credits	Credits	Total Credits
1	2	3	4	5	6	7	8	9	10
1 (4.5)	I	**SBCSC101** : Programming In C (2Cr) (Theory) **SBCSC102** : Operating System (2Cr) (Theory) **SBCSC103** : Programming In C (2Cr) (Practical)	NA	**SBCSG101** : Introduction to Information Technology (2Cr) **SBCSG102 :** Mathematical Techniques in Computer Science (2Cr)	**SBCSV101 :** Office Automation (2Cr) **SBCSS101 :** Web Programming using HTML (2Cr)	**AECEN101 :** Communication Skills (2Cr) **VECCI101 :** Constitution of India (2Cr) **IKSCM101 : (2Cr)**	**CCXXX101:** (XXX any one of NCC/NSS/Sports/ Culture/Health Wellness/ Yoga Education / Fitness) (2 Cr)	22	44
	II	**SBCSC151** : OOPs with C++ (2Cr) (Theory) **SBCSC152 :** Computer Network (2Cr) (Theory) **SBCSC153** : OOPs with C++ (2Cr) (Practical)	**SBCSC151:** RDBMS (2Cr)	**SBCSG151** : Digital Electronics and Microprocessors (2Cr) **SBCSG152** Hardware & Networking Essentials (2Cr)	**SBCSV151** : Digital Literacy (2Cr) **SBCSS151 :** DTP and Multimedia (2Cr)	**AECXX151** Business Communication **(2Cr)** **VECES151** Environmental Studies **(2Cr)**	**CCXXX151** *(XXX any one of NCC/NSS/Sports/ Culture/Health Wellness/ Yoga Education / Fitness)* **(2Cr)**	22	
***Exit option*: UG Certificate in Major DSC on completion of 44 credits** and additional **4 credits from NSQF / Internship**									

Basket 1: Minor Subject

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

Semester	BOS proposing Minor	Details of Minor Subject	
		CODE	**Title of the Corse**
Semester I	**No Minor**		
Semester II ***(Student will choose any one Minor Course of 02 Credits)***	Adhoc Board in Comp Sci, NMDC	SBCSC151	RDBMS (2Cr)

Basket 2: Generic Elective course (GE)

Note*: Each BOS shall suggest Generic Elective Courses (at least one each for Group A and Group B) for semesters I and II*

* Students will choose one GE course each from Group A and B of Basket 2 (other than subjects DSC and DSM in col. 3 and 4).

Semester	**BOS proposing GE**	**Group A**		**Group B**	
		CODE	**Title of the Corse**	**CODE**	**Title of the Corse**
Sem I	Adhoc Board in Comp Sci, NMDC	SBCSG101	Introduction to Information Technology (2Cr)	SBCSG102	Mathematical Techniques in Computer Science (2Cr)
Sem II	Adhoc Board in Comp Sci, NMDC	SBCSG151	Digital Electronics and Microprocessors (2Cr)	SBCSG152	Hardware & Networking Essentials (2Cr)

Vocational & Skill Enhancement Course (V/SEC)

Semester	BOS proposing GE	Group A	
		CODE	Title of the Corse
Sem I	Adhoc Board in Comp Sci, NMDC	SBCSV101	Office Automation (2Cr)
Sem I	Adhoc Board in Comp Sci, NMDC	SBCSS101	Web Programming using HTML (2Cr)
Sem II	Adhoc Board in Comp Sci, NMDC	SBCSV151	Digital Literacy (2Cr)
Sem II	Adhoc Board in Comp Sci, NMDC	SBCSS151	DTP and Multimedia (2Cr)

Basket 3: AEC/VEC/IKS

Semester	Name of the Second Language	Details of the Course	
		CODE	**Title of the Corse (Paper)**
Semester I AEC	1. English	AECEN101	Communication Skills
Semester I	VEC	VECC1101	Constitution of India
Semester I	IKS	IKSCM101	Indian Knowledge System
Semester II AEC	1. English	AECXX151	Business communications
Semester I	VEC	VECES151	Environmental Studies

Basket 4: Field work / Project /Internship/ OJT/ Apprenticeship/ Case study Or Co-Curricular Courses (CC) (common across faculty)

Semester	Details of the Course	
	CODE	Title of the Corse (Paper)
Semester I	CCXXX101	Any one of NCC/NSS/Sports/Cultural/Health wellness/ Yoga Education / Fitness
Semester II	CCXXX151	Any one of NCC/NSS/Sports/Cultural/Health wellness/ Yoga Education / Fitness

B. Sc. CS First Year Semester I *(Level 4.5)*

Teaching Scheme

	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs/ week)	
			Theory	Practical	Total	Theory	Practical
Major	SBCSC101	Programming In C	02	--	**02**	02	--
	SBCSC102	Operating System	02	--	**02**	02	--
	SBCSC103	Programming In C (Practical)	-	02	**02**		04
Generic Electives	SBCSG101	Introduction to Information Technology (2Cr)	02	--	**02**	02	--
	SBCSG102	Mathematical Techniques in Computer Science (2Cr)	02	--	**02**	02	--
Vocational & Skill Enhancement Course	SBCSV101	Office Automation (2Cr)	--	02	**02**	--	04
	SBCSS101	Web Programming (2Cr)	--	02	**02**	--	04
Ability Enhancement Course	AECEN101	L1 – Communication Skills	02	--	**02**	02	--
Value Education Course (VEC)	VECCI101	Constitution of India	02	-	**02**	02	--
Indian Knowledge System (IKS)	IKSCM101	Indian Knowledge System	02	--	**02**	02	--
Community Engagement Services (CES)	CCXXX101	Any one of NCC/ NSS /Sports/ Culture /Health Wellness /Yoga Education / Fitness	-	02	**02**	--	04
Total Credits			**14**	**08**	**22**	**14**	**16**

B. Sc. CS First Year Semester I *(Level 4.5)*

Examination Scheme

[20% Continuous Assessment (***CA***) and 80% End Semester Assessment (***ESA***)]

(For illustration we have considered a paper of 02 credits, 50 marks, need to be modified depending on credits assigned to individual paper)

Subject (1)	Course Code (2)	Course Name (3)	Theory				Practical		Total Col (6+7)/ Col (8+9) (10)
			Continuous Assessment(CA)			ESA			
			Test I (4)	Test II (5)	Avg of (T1+T2)/2 (6)	Total (7)	CA (8)	ESA (9)	
Major	SBCSC101	Programming In C	10	10	10	40	--	--	50
	SBCSC102	Operating System	10	10	10	40	--	--	50
	SBCSC103	Programming In C (Practical)	--	--	--	--	20	30	50
Generic Electives	SBCSG101	Introduction to Information Technology (2Cr)	10	10	10	40	--	--	50
	SBCSG102	Mathematical Techniques in Computer Science (2Cr)	10	10	10	40	--	--	50
Vocational & Skill Enhancement Course	SBCSV101	Office Automation (2Cr)	--	--	--	--	20	30	50
	SBCSS101	Web Programming (2Cr)	--	--	--	--	20	30	50
Ability Enhancement Course	AECEN101	L1 – Communication Skills	10	10	10	40	--	--	50
Value Education Course	VECCI101	Constitution of India	10	10	10	40	--	--	50
Indian Knowledge System	IKSCM101	Indian Knowledge System	10	10	10	40	--	--	50
Community Engagement Services (CC)	CCXXX101	Any one of NCC/ NSS /Sports/ Culture /Health Wellness /Yoga Education / Fitness	--	--	--	--	20	30	50

B. Sc. CS First Year Semester II *(Level 4.5)*

Teaching Scheme

	Course Code	CourseName	CreditsAssigned			TeachingScheme (Hrs/ week)	
			Theory	Practical	Total	Theory	Practical
Major	SBCSC151	OOPs with C++	02	--	**02**	02	--
	SBCSC152	Computer Network	02	--	**02**	02	--
	SBCSC153	OOPs with C++ (Practical)	-	02	**02**	--	04
Minor	SBCSC151	RDBMS	02	--	**02**	02	--
Generic Electives	SBCSG151	Digital Electronics and Microprocessors	02	--	**02**	02	--
	SBCSG152	Hardware & Networking Essentials	02	--	**02**	02	--
Vocational & Skill Enhancement Course	SBCSV151	Digital Literacy (2Cr)	--	02	**02**	--	04
	SBCSS151	DTP and Multimedia	--	02	**02**	--	04
Ability Enhancement Course	AECXX101	Business Communication	02	--	**02**	02	--
Value Education Course (VEC)	VECES151	Environmental Studies	02	-	**02**	02	--
Community Engagement Services (CES)	CCXXX151	Any one of NCC/ NSS /Sports/ Culture /Health Wellness /Yoga Education / Fitness	-	02	**02**	--	04
Total Credits			**14**	**08**	**22**	**14**	**16**

B. Sc. First Year Semester II *(Level 4.5)*

Examination Scheme

[20% Continuous Assessment (***CA***) and 80% End Semester Assessment (***ESA***)]

(For illustration we have considered a paper of 02 credits, 50 marks, and need to be modified depending on credits of individual paper)

Subject (1)	Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) / Col (8+9)] (10)
			Continuous Assessment(CA)			ESA			
			Test I (4)	Test II (5)	Avg of (T1+T2)/2 (6)	Total (7)	CA (8)	ESA (9)	
Major	SBCSC151	OOPs with C++	10	10	10	40	--	--	50
	SBCSC152	Computer Network	10	10	10	40	--	--	50
	SBCSC153	OOPs with C++ (Practical)	--	--	--	--	20	30	50
Minor	SBCSC151	RDBMS	10	10	10	40	--	--	50
Generic Electives	SBCSG151	Digital Electronics and Microprocessors	10	10	10	40	--	--	50
	SBCSG152	Hardware & Networking Essentials	10	10	10	40	--	--	50
Vocational & Skill Enhancement Course	SBCSV151	Digital Literacy (2Cr)	--	--	--	--	20	30	50
	SBCSS151	DTP and Multimedia	--	--	--	--	20	30	50
Ability Enhancement Course	AECXX101	Business Communication	10	10	10	40	--	--	50
Value Education Course	VECES151	Environmental Studies	10	10	10	40	--	--	50
Community Engagement Services (CC)	CCXXX151	Any one of NCC/ NSS /Sports/ Culture /Health Wellness /Yoga Education / Fitness	--	--	--	--	20	30	50

Guidelines for Course Assessment:

A. Continuous Assessment (CA) (20% of the Maximum Marks):

This will form 20% of the Maximum Marks and will be carried out throughout the semester. It may be done by conducting **Two Tests** (Test I on 40% curriculum) and **Test II** (remaining 40% syllabus). Average of the marks scored by a student in these two tests of the theory paper will make his **CA** score (col 6).

B. End Semester Assessment (80% of the Maximum Marks):

(For illustration we have considered a paper of 02 credits, 50 marks and need to be modified depending upon credits of an individual paper)

1. **ESA Question paper will consists of 6 questions, each of 10 marks.**
2. **Students are required to solve a total of 4 Questions.**
3. **Question No.1 will be compulsory and shall be based on entire syllabus.**
4. Students need to solve **ANY THREE** of the remaining Five Questions (Q.2 to Q.6) and shall be based on entire syllabus.

C. Assessment of Co-Curricular courses (CC):

a. Continuous Assessment (CA) of the CC course shall be done by the respective course coordinator depending on the regularity, performance of a student and his participation in the international, national, state, university, college level events or camps, wherever applicable.

b. End Semester Assessment (ESA) shall be done on the basis of the write-up and presentation by the student on the activities that he has carried out throughout the semester.

c. Students have freedom to take more than one CC courses, however, score of the best performing CES shall be considered for final assessment.

D. Syllabi, Teaching Scheme and Examination Scheme for the courses in Column 7 and Column 8 (AEC, VEC, IKS, CI, EVS, CCs, etc.) shall be common for all the students from different faculties.

Note: Number of lectures required to cover syllabus of a course depends on the number of credits assigned to a particular course. One credit of theory corresponds to 15 Hours lecturing and for practical course one credit corresponds to 30 Hours. For example, for a course of two credits 30 lectures of one hour duration are assigned, while that for a three credit course 45lectures.

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Swami Ramanand Teerth Marathwada University's

New Model Degree College, Hingoli

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

SBCSC101: *Programming in C*

Course pre-requisite:

1. 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			**8**
	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,	
	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			
	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, 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	**8**
	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			
	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			
	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,	**8**
	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	**32**

Reference Books:

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

SBCSC102: *Operating System*

Course pre-requisite:

2. 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**	**8**
	1.1	What is an operating system?, different services of operating system (information management, process management & device management),	
	1.2	Users view and system view about operating system, terminology of operating system,	
	1.3	Operating system hierarchical& exceeded machine view, what is distributed operating system?, open source operating system, os services.	
2.0		**Structure of Operating System**	**8**
	2.1	Operating system structure, operating system architecture (single process and multi process), operating system interfaces commands(command line and gui), booting process of operating system , what is system call,	
	2.2	Types of system call- Process control, file management,	

		device management, Information Maintenance, Communication , Protection , Memory management, Single contiguous memory management, Fragmentation, Paging, Partition allocation, Revocable memory management, Segmented memory management	
3.0		**Process Management**	**8**
	3.1	Introduction, What is process, Evolution and multiprogramming, State model, Process control work, Process scheduling, Job scheduling criteria , Create process, Kill process, Dispatch process,	
	3.2	Block process, Multiprocessor system, Concept of dead lock, Concept of race condition	
4.0		**Information management and security**	**8**
	4.1	Introduction, Disk basics, Allocation strategy module, Automatic allocation and dynamic allocation, Simple file system, General model and file system, Security threads,	
	4.2	Types of threads, Computer system assets, Concept of protection ,What is intruder?, Intrusion techniques, Password protection strategies, Types of virus , Introduction of Linux OS	
		Total	

Reference Books:

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

SBCSC103: *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**

SBCSG101: *Introduction to Information Technology*

Course pre-requisite:

1. 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			**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			**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			
	3.1	Input Devices: Keyboard, Point-and-draw devices, Data scanning devices, Digitizer, Electronic Card Reader, Speech Recognition Devices, and Vision input devices.	**8**
	3.2	Output Devices: Monitor, Printers, Plotter, Screen image projectors, Voice response systems.	
4.0			
	4.1	Computer Software: Software, Relationship between Hardware and Software, Types of Software.	**6**
	4.2	Internet: Definition, History, Basic Services (E-mail, FTP, Telnet, Usenet News), WWW, Search Engine, Use of Internet.	
	4.3	Classification of Computers: Notebook, PCs, Workstation, Mainframe, Super, Clint and Server, Hand held computers (Tablet, PDA, Smartphone).	
		Total	**30**

Reference Books:

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

SBCSG102: *Mathematical Techniques in Computer Science*

Course pre-requisite:

1. Programming
   abstraction or equivalent

Course objectives:

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

Course outcomes:

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

  1. Perform operations on matrices and sparse matrices
  2. Compute the determinant, rank and eigen values of a matrix DRAFT
  3. Perform operations on vectors, the dot product and cross product
  4. Represent vectors geometrically and calculate the gradient, divergence, curl
  5. Apply linear algebra and vector calculus to solve problems in sub-disciplines of computer science.

Curriculum Details

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0			**6**
	1.1	Set Theory: Introduction, Basic Concepts, Terminology and notation, Sub set, Operation on sets	
	1.2	Algebra sets, Venn Diagram, Collection of sets, Multiset, Countable and Uncountable sets, Ordered pairs and Cartesian product, Computer representation of sets, fuzzy sets.	
2.0			**8**
	2.1	Relation and Function: Introduction, Relations on Sets, Some operations on sets, Types of Relations in a set, Properties of Relations, Representation of Relations, Composition of Relations, Closure of Relations.	
	2.2	Function: Introduction, Classification of Functions, Types of Functions, Composition of Functions, Recursively defined function, Some Special Function.	

3.0			
	3.1	Graph Theory: Introduction, Basic terminology, Simple graph, Multigraph, pseudo graph, Degree of vertex, Types of Graphs, Subgraphs and Isomorphic graphs, Operation of Graphs,	**8**
	3.2	Paths, Cycles and Connectivity, Eulerian and Hamiltonian graph, Shortest path problems, Representation of graph, Planar Graphs, Graph Coloring.	
4.0			
	4.1	Trees: Introduction, Trees and their properties, Spanning Tree, Binary Tree, Tree Traversal.	**8**
	4.2	Probability: Introduction, Random Experiment, Sample Space, Set Notations, Probability Events, Compound Event, Conditional Probability.	
		Total	**30**

Reference Books:

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

SBCSV101: *Office Automation*

Course pre-requisite:

1. 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			**8**
	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	
2.0			**8**
	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.	
3.0			**8**
	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	
	3.2	Introduction to Power point Creating PowerPoint Presentation.	
4.0			**8**
	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	
	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)

SBCSV102: *Web Programming*

Course pre-requisite:

1. 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			**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-HTML, HEAD, TITLE, BODY. Paragraph Tags, List tags, Horizontal Rule Tag, Headings Tags, Block quote Tags, Address Tags, FONT Tag, PRE tag, DIV tags, SPAN tag& other different formatting tags.	
2.0			**4**
	2.1	Linking in HTML: U.R.L. concept, Hyperlink (Anchor) Tag & it's all attributes, Creating Email Hyperlinks (using mailto anchor).	
	2.2	Images in HTML: Introduction: Image & image formats, <img> tag& it's all attributes, Inline & Floating Images, Using Images as links.	
3.0			**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			**6**
	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.	
		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

Swami Ramanand Teerth Marathwada University's

New Model Degree College, Hingoli

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

SBCSC151: *Object Oriented Programming with C++*

Course pre-requisite:

1. 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			**8**
	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, Structure and Unions	
2.0			**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			**8**
	3.1	**Operator overloading** Overloading Unary Operators, Overloading Binary Operators, Overloading using Friend Function, Rules for Overloading.	
4.0			**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++”

SBCSC152: *Computer Networks*

Course pre-requisite: A good understanding of the core concept of computer

Course objectives:

Understand the concepts behind computer networks and data communication. Learn the use of different layers in standard reference models used for communication. Learn the main features of protocols used at various layers. Understand the utility of different networking devices..

Course outcomes:

- On successful completion of the course, students will be able to:
- 1. Describe the hardware and software components used in a network.
- 2. Compare OSI and TCP/IP reference models at various layers.
- 3. Describe, analyze and compare different data link, network, and transport and application layer protocols.
- 4. design/implement data link and network layer protocols in a simulated networking environment

Curriculum Details

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		**Introduction**	**8**
	1.1	Types of computer networks, Internet, Intranet, network topologies, network classifications.	
	1.2	Layered architecture approach, OSI Reference Model, TCP/IP Reference Model.	
2.0		**Physical Layer**	**8**
	2.1	Analog signal, digital signal, digital modulation techniques (ASK, PSK, QAM), encoding techniques,	
	2.2	The maximum data rate of a channel, transmission media (guided transmission media, wireless transmission, satellite communication), multiplexing (frequency division multiplexing, time-division multiplexing, wavelength division multiplexing).	
3.0		**Data Link MAC and Network Layer:**	**8**
	3.1	Data link layer services, error detection and correction techniques, error recovery protocols (stop and wait, go back n, selective repeat), multiple access DRAFT protocols with collision detection, MAC addressing, Ethernet, data link layer switching, point-to-point protocol.	
	3.2	Networks and Internetworks, virtual circuits and datagram, addressing, sub netting, Routing algorithm (Distance vector and Dijkstra routing), Network Layer protocol- (ARP, IPV4, ICMP, IPV6).	
4.0		**Transport and Application Layer:**	**8**
	4.1	Process to process Delivery- (client-server paradigm, connectionless versus connection-oriented service, reliable versus unreliable); User Datagram Protocols,	
		TCP/IP protocol, Flow Control. FTP (File Transfer Protocol), SMTP (Simple Mail Transfer Protocol), Telnet (Remote login protocol), WWW (World Wide Web), HTTP (HyperText Transfer Protocol), URL.	
		Total	**32**

Reference Books:

1. Tanenbaum, A.S. & Wethrall, D.J, Computer Networks, Pearson Education, 2012.
2. Forouzan, B. A., Data Communication and Networking, McGraw-Hill Education, 2017.

Additional References

(i) Kurose, J. F., & Ross, K. W. Computer Networking: A Top-Down Approach, Pearson Education India, 2017.
(ii) Stallings, W. Data and Computer Communications, 10th edition, Pearson Education India, 2017.

SBCSC153: *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**

SBCSG151: *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, order	
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 ROWID: Extended & Restricted ROWID	
	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, Constants and variables, Data types, control structure,	
	4.2	Introduction to Cursor & Locks, Introduction to Database Objects: Stored Procedures and Functions, Database Triggers	
		Total	**30**

Reference Books:

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

SBCSG151: *Digital Electronics and Microprocessors*

Course pre-requisite:

1. A good understanding of the core concept of computer

Course objectives:

- To learn about the design principles of different digital electronic circuits
- To study the applications of above circuits
- Student will understand the 8086 microprocessor.
- Using this course student will familiarize with the architecture of microprocessors.
- Make the student aware about the functional organization of physical components and architecture of a 8086 Microprocessor Kit.

Course outcomes:

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

  1. Describe the internal architecture of Intel microprocessors.
  2. Define and implement interfaces between the microprocessor and the devices.
  3. Write assembly language

Curriculum Details

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0			**6**
	1.1	**Boolean Algebra and Logic Circuits**: Fundamental of Boolean Algebra, Postulates of Boolean Algebra, Principle of Duality,	
	1.2	Theorems of Boolean Algebra, Boolean Functions, Logic Gates, Logic Circuits, Flip-flop, Counters, Registers	
2.0			**8**
	2.1	**Introduction to Microprocessor**: Evolution, Microcontroller, Embedded Microprocessor, 16-Bit Intel Microprocessor Architecture,	
	2.2	Pin Description of 8086, Operating modes, Minimum & Maximum modes, Register Organization, BIU & EU, and Interrupts.	
3.0			**6**
	3.1	**8086 Instruction Set**: Instruction Groups, Addressing Mode Byte, Segment Register Selection, 8086 Instructions.	
4.0			**6**
	4.1	**Assembly Language Programs for 8086**: To find largest/smallest number in a array, To find Largest 8-bit number, Ascending order, Descending order, Byte move, Word move, Byte/Word move using REP instruction, sum of 16-bits/32-bits number series, Multibyte addition and etc	
	4.2	**Standards for Bus Architecture and Ports:** ISA, EISA, MCA, PCI, VESA, USB, IDE, EIDE, ATA, ATAPI and SCSI.	4
		Total	**30**

Reference Books:

1. R.P. Jain, “Modern Digital Electronics”, Tata McGraw Hill
2. B. Ram, “Advance Microprocessor and Interfacing”, Pearson
3. Malvino & Brown, “Digital Computer Electronics”, Tata McGraw Hill
4. M. Morris Mano, “Computer System Architecture”, Pearson
5. P. Pal Chaudhari, “Computer Organisation and Design”, PHI

SBCSG151: *Hardware & Networking Essentials*

Course pre-requisite:

2. A good understanding of the core concept of computer

Course objectives:

- To learn about the design principles of different digital electronic circuits
- To study the applications of above circuits
- Student will understand the 8086 microprocessor.
- Using this course student will familiarize with the architecture of microprocessors.
- Make the student aware about the functional organization of physical components and architecture of a 8086 Microprocessor Kit.

Course outcomes:

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

1. Describe the internal architecture of Intel microprocessors.
2. Define and implement interfaces between the microprocessor and the devices.
3. Write assembly language

Curriculum Details

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0			**8**
	1.1	Computer Fundamentals History and Generations of Computer, Architecture of the Computer, Description of Different parts of a computer	
	1.2	Idea about System Software and Application Software. Operating system concept (Basic knowledge), Fundamentals of Electricity, About AC and DC	
2.0			**8**
	2.1	SMPS Features, Functions, Types of SMPS, Power distribution in SMPS, Components and Circuits inside the SMPS Unit, Types of UPS Offline, Line Interactive & Online, Working Principle of each type of UPS.	
	2.2	Connecting, Maintenance and Troubleshooting.	
3.0			**8**
	3.1	Introduction to RAM, ROM, Cache Memory, Buffer Memory, Virtual Memory. Speed, Timeline (EDO, NON-EDO, SD, RD, DDR, DDR2, DDR3, DDR4), Hybrid Memory	
4.0			**6**
	4.1	Introduce the Networking concept including sharing of different resources, use of Internet, accessing/ browsing, downloading and e-mailing.	
		Total	

SBCSV151: *Digital Literacy*

SBCSS151: *DTP & Multimedia*

Course pre-requisite:

1. 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:

- 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

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