SHRI GURU RAM RAI UNIVERSITY

[Estd. by Govt. of Uttarakhand, vide Shri Guru Ram Rai University Act no. 03 of 2017 & recognized by UGC u/s (2f) of UGC Act 1956]

SYLLABUS
Bachelor of Science (Information Technology)- Ist Year

Under CBCS Pattern
as per NEP 2020

School of Computer Application & Information Technology
(w.e.f. 2022 Session)

Eligibility for admission:

Intermediate (10+2) or equivalent in any discipline from any recognized board with minimum 45%.As NEP 2020 has been implemented from 2022 following nomenclature have been introduced in B.Sc.(IT) - 4 year degree programme .

EXIT POLICY

S.NO	Name of Course	Remarks
1	Certificate course in Information Technology	If candidates exit after completing 1st year (42 credits)
2	Diploma course in Information Technology	If candidates exit after completing 2nd year i.e will complete Certificate course in Information Technology (1year) + 1Year =Total 2 years
3	Bachelor of Science (Information Technology)	If candidates exit after completing 3rd year i.e Diploma course in Information Technology(2years) + 1Year =Total 3 year
4	Bachelor of Science (Information Technology) with research	If candidates completes 4 year i.e completing 3rd year Bachelor of Science (Information Technology) 3years + 1 Year =Total 4 Years

EXAMINATION SCHEME

1. Internal assessment of each course will be of **30 marks** and will be done by School of CA & IT through internal assessment examination ,assignment ,Attendance and Teacher Assessment
2. External assessment of each course will be of 70 marks and will be done through University examination

INTERNAL ASSESSMENT [30 MARKS]

1. One internal assessment examination =15 marks
2. One Assignment =05 marks
3. Teacher Assessment=10 marks

SCHEME OF INTERNAL EXAMINATION QUESTION PAPER

SECTION	NO OF QUESTONS AND MARKING	QUESTION NUMBERING PATTERN	COURSE OUTCOME NUMBER
Section A	5 Q each 1 marks	1a to 1e	All CO1
Section B	2 Question each 2.5 marks	2a or 2a 2b or 2b	All CO2
Section C	1 Question 5 marks	3a or 3b	All CO3

Assignment and Teacher Assessment =10 marks [CO4, CO5, CO6]

Program Outcome (PO) for B.Sc (IT) 4 Year

PROGRAMME OUTCOMES (POS):

It is envisioned that the graduated students of B.Sc. (Information Technology) degree, will be able to possess following Attributes and demonstrate related competencies:-

PO1	Computational knowledge	Acquire knowledge of Computing (algorithm and Coding) &Computing Specialization and Domain Knowledge of proper computing models for defined problems.
PO2	Problem analysis	Identify, formulate and analyze complex computational problems using mathematics, computer science concepts and relevant domains.
PO3	Design/development of solutions	Ability to design efficient solution for complex, real-life problem, system software or Application Software as per needs and specifications of customers.
PO4	Conduct investigations of complex computing problems	Use research-based knowledge and research methods including design of experiments, analysis & interpretation of data & synthesis of information to reach valid conclusions.
PO5	Modern Tool Usage	Ability to demonstrate skills to use modern technologies and tools to analyze and solve the software development problems.
PO6	Professional Ethics	Ability to perform professional practices in an ethical way, keeping in the mind cyber regulations, laws, Intellectual Property Right and norms of professional computing practices.
PO7	Life-Long Learning	Ability to develop confidence and ability for self-education and life-long learning in the broadest context of technological change. Ability to adapt or change the acquired knowledge with change in the technology.
PO8	Project management and finance	Ability to demonstrate knowledge & understanding the Software engineering management principles and apply them as a member & as a leader in a team to manage multidisciplinary projects. Ability to make budget, make estimates of time, effort, time and analyse risk and reschedule the projects accordingly.
PO9	Communication Efficacy	Ability to effectively communicate with the technical community and with the society about complex computing activities in both verbal and written form, design documents, letters, make effective presentations.

PO10	Societal and Environmental Concern	Ability to understand the impact of IT solutions in a global and societal context. Ability to apply all concepts of green computing to preserve environment and use IT resources in an effective and optimized way.
PO11	Individual and Team Work	Ability to work multi-disciplinary team both as a member and leader, as per need. To develop the leadership and managerial skills in the student.
PO12	Innovations and entrepreneurship	Ability to apply innovation and promote innovative ideas to a suitable opportunity to create value and wealth for the betterment of the individual and society at large.

STUDY & EVALUATION SCHEME
CHOICE BASED CREDIT SYSTEM
(CBCS)

FIRST SEMESTER:

S. No.	Course Category	Couse Code	Course Name	Periods				Evaluation scheme		Subject Total
				L	T	P	C	Sessional (Internal)	External (ESE)	
Theory										
1	Major/Core	BS101	Office automation	3	1	-	4	30	70	100
2	Major/Core	BS102	Programming in 'C'	3	1	-	4	30	70	100
3	**Major Elective**	BSME103A	Programming Paradigm and Internet Technology	3	1	-	4	30	70	100
		BSME103B	Software Analysis and Design							
4	**Minor/Open Elective**	BSOE104	To be selected from open Elective Basket of University	2	-	-	2	30	70	100
5	**Vocational**	BSVC105	Basic Mathematics	2	1	-	3	30	70	100
6	**Co-Curricular**	BSCC106	To be selected from Co-curricular course Basket of University	2	-	-	-	30	-	Grade
Practical										
7	Major/Core	BSP11	Lab- Office Automation	-	-	4	2	30	70	100
8	Major/Core	BSP12	Lab- Programming in C	-	-	4	2	30	70	100
			Total	**15**	**4**	**8**	**21**	**240**	**490**	**700**

STUDY & EVALUATION SCHEME
CHOICE BASED CREDIT SYSTEM
(CBCS)

SECOND SEMESTER:

S. No.	Course Category	Couse Code	Course Name	Periods				Evaluation scheme		Subject Total
				L	T	P	C	Sessional (Internal)	External (ESE)	
Theory										
1	Major/Core	BS201	Operating System	3	1	-	4	30	70	100
2	Major/Core	BS202	Data Structure using C	3	1	-	4	30	70	100
3	**Major Elective**	BSME203A	Cloud Computing	3	1	-	4	30	70	100
		BSME203B	Artificial Intelligence							
4	**Minor/Open Elective**	BSOE204	To be selected from open Elective Basket of University	2	-	-	2	30	70	100
5	**Vocational**	BSVC205	Cyber Security and cyber Law	2	1	-	3	30	70	100
6	**Co-Curricular**	BSCC206	To be selected from Co-curricular course Basket of University	2	-	-	-	30	-	Grade
7	Major/Core	BSP21	Lab UNIX	-	-	4	2	30	70	100
8	Major/Core	BSP22	Lab Data Structure	-	-	4	2	30	70	100
			Total	**15**	**4**	**8**	**21**	**240**	**490**	**700**

SHRI GURU RAM RAI UNIVERSITY

Patel Nagar, Dehradun-248001, Uttarakhand, India

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Minor/Open Elective Basket

School	Departments	Minor Elective Paper I & II Semester	Minor Elective Paper III & IV Semester
School of Humanities and Social Sciences	Hindi	हिंदी भाषा और अनुवाद	हिन्दी गद्य साहित्य
	English	Review of Grammar	Professional English
	Defence & Strategic Studies	Military History of Uttarakhand	Cyber Security
	Drawing & Painting	Creative Process in drawing	Applied Art
	Geography	Physical Geography	Fundamental of Natural disasters
	Home Science	Fundamentals of Nutrition	Family Resource Management-1
	Music	Critical study of Rags & Taals	Voice Modulation
	Psychology	Psychology for living	Psychology of gender
	Economics	Fundamentals of Economics	Basics of Demography
	History	History of India from the earliest times up to 300 CE Indian society and culture through the ages	History of Medieval India
	Political Science	Awareness with Civic Rights	Reading Gandhi
	Garhwali	गढ़वाली संस्कृति	
	Statistics	Statistical Methods & Probability Theory	Sampling distribution
	Mass Communication	Introduction to Journalism	Introduction to Broadcast Media
	Yoga	Fundamental of Yoga	Basic Practicum-1 Basic Practicum-2
School of Computer Application & Information Technology	Computer Application	Office Automation	Management Information System
	Information Technology	BSOE104 Fundamental of Computer & Information Technology. BSOE204 Advance Fundamental of	BSOE304 Web Designing BSOE404 Advance Web Designing

		Computer & Information Technology	
School of Management & Commerce Studies	Management	Entrepreneurship Development	Indian Business & Economy
	Commerce	Entrepreneurship and Small Business	Banking And Micro Finance
	Hospital Administration	Business Statistics	Fundamentals of Accounting
School of Basic & Applied Sciences	Zoology	Environmental science and Basic concepts of Ecology	Bio-Instrumentation, Bioinformatics and Biostatistics
	Geology	Geohydrology	Remote Sensing and GIS
	Mathematics	Elementary Algebra and Trigonometry	Analytical Geometry
	Botany	Plant Science-I	Plant Science-II
	Biotechnology	Advance Bioinformatics 1	Bioethics and Biosafety
		Advanced Bioinformatics II	Biotechnology and Human Welfare
	Chemistry	Basic Analytical chemistry-I	Basics of Analytical Chemistry-II
	Microbiology	Introduction and Scope of Microbiology-I	Intellectual Property Right
		Introduction and Scope of Microbiology-II	Biotechnology and Human Welfare
	Physics	Statistical Physics/Numerical methods/ Waves and Oscillations	Solid State Physics/Optoelectronic Devices/Classical Dynamics

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CO-CURRICULAR BASKET

S.N	School	Departments	Vocational/Skill Development Courses
1	School of Humanities and Social Sciences	Hindi	* प्रयोजनमूलक हिंदी
2		English	* Communicative English Grammar * English Listening and Speaking Skills
3		Geography	* Field Survey *Elements of Map Reading
4		Home Science	* Fundamentals of Nutrition & cooking skills with healthy recipe Development
5		Defence & Strategic Studies	* Fundamentals of Disaster Management
6		Music	* Practical Aspects of Indian Music
7		Psychology	* Managing Stress
8		Economics	* Labor Economics-I
9		History	* Introduction of Archeology
10		Political Science	* Issues of rural government * Study of Voting Pattern and Voting Behavior
11		Statistics	* Network analysis & theory of sequencing
12		Garhwali	अनुवाद- गढ़वाली अनुवाद लेखन का अभ्यास
13	School of Computer Application & Information Technology	Computer Application	General English
14			Communication Skills
15			Environmental Science
16			Logical Reasoning
17			Health Awareness and Hygiene
18			PDP
19		Information Technology	BSCC106 Environmental Studies
20			BSCC206 Professional Communication
21			BSCC306 Healthcare and Hygiene
22			BSCC406 Personality Development & Formal Writing
23			BSCC506 Logical reasoning
24			BSCC606 Numerical Aptitude
25	School of Management & Commerce Studies	Management	Basics Microsoft Excel
26			Advanced Excel
27			Logical Reasoning
28			PDP

29			E-Filling and Taxation
30			Digital Marketing
31		Commerce	Basics of MS-Office
32			IT Tools for Corporates
33			Mathematical Aptitude
34			Soft Skills
35			E-Filing of Return
36			Social Media Marketing or Tally
37		Hospital Administration	Microsoft Excel
38			Advanced Excel
39			Logical Reasoning
40			Communication skills and Personality Development
41			Direct Tax (Return filing)
42			Content Marketing
43	School of Basic & Applied Sciences		English Communication
44			Environmental Science
45			Management Paradigms from Bhagwat Gita
46			Meditation
47			Vedic Science
48			Essence of Indian Traditional Knowledge
49			Molecular Diagnostics
50			Drug Designing
51			Basic concept of Ecology
52			Human Development
53			Smart Farming
54			Enzymology/ Drug Designing/ Evolutionary Biology
55			Human Development
56			Communication Skills

FIRST SEMESTER

Course code : BS101				
Course Name :OFFICE AUTOMATION				
Semester /Year : 1st /1st				
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVE:

1. Office tools course would enable the students in crafting professional word documents, excel spread sheets, power point presentations, Database using the Microsoft suite of office tools.
2. To familiarize the students in preparation of documents and presentations with office automation tools.

COURSE CONTENTS

UNIT- 1 MS-WORD [No. of Hours: 10]

MS Word -Working with Documents-Opening & Saving files, Editing text documents, Inserting, Deleting, Cut, Copy, Paste, Undo, Redo, Find, Search, Replace, Formatting page & setting Margins, Converting files to different formats, Importing & Exporting documents, Sending files to others, Using Tool bars, Ruler, Using Icons, using help, Formatting Documents-Setting Font styles, Font selection-style, size, colour etc., Type face-Bold, Italic, Underline, Case settings, Highlighting, Special symbols, Setting Paragraph style, Alignments, Indents, Line Space, Margins, Bullets & Numbering. Setting Page style-Formatting Page, Page tab, Margins, Layout settings, Paper tray, Border & Shading, Columns, Header & footer, Setting Footnotes & end notes–Shortcut Keys; Inserting manual page break, Column break and line break, Creating sections & frames, Anchoring & Wrapping, Setting Document styles, Table of Contents, Index, Page Numbering, date & Time, Author etc., Creating Master Documents, Web page. Creating Tables-Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, and Formula.

UNIT –2 MS-EXCEL [No. of Hours: 10]

Spread Sheet & its Applications, Opening Spreadsheet, Menus-main menu, Formula Editing, Formatting, Toolbars, Using Icons, Using help, Shortcuts, Spreadsheet types. Working with Spreadsheets-opening, Saving files, setting Margins, Converting files to different formats(importing, exporting, sending files to others), Spread sheet addressing-Rows, Columns & Cells, Referring Cells & Selecting Cells–Shortcut Keys. Entering & Deleting Data-Entering data, Cut, Copy, Paste, Undo, Redo, Filling Continuous rows, columns, Highlighting values, Find, Search & replace, Inserting Data, Insert Cells, Column, rows & sheets, Symbols, Data from external files, Frames, Clipart, Pictures, Files etc, Inserting Functions, Manual breaks, Setting Formula-finding total in a column or row, Mathematical operations (Addition, Subtraction, Multiplication, Division, Exponentiation), Using other Formulae. Creating Charts -Drawing. Printing.

UNIT -3 MS-POWER POINT **[No. of Hours: 10]**

Introduction to presentation –Opening new presentation, Different presentation templates, setting backgrounds, selecting presentation layouts. Creating a presentation -Setting Presentation style, Adding text to the Presentation. Formatting a Presentation-Adding style, Colour, gradient fills, Arranging objects, Adding Header & Footer, Slide Background, Slide layout. Adding Graphics to the Presentation-Inserting pictures, movies, tables etc into presentation, Drawing Pictures using draw. Adding Effects to the Presentation-Setting Animation & transition effect. Printing Handouts, Generating Standalone Presentation viewer.

UNIT –4 MS-ACCESS **[No. of Hours: 10]**

Introduction, Planning a Database, Starting Access, Access Screen, Creating a New Database, Creating Tables, Working with Forms, Creating queries, Finding Information in Databases, Creating Reports, Types of Reports, Printing & Print Preview–Importing data from other databases viz.MS Excel etc.

TEXT BOOKS:

TB1. Microsoft Office Word, Torben Frandsen, 2010, Torben Lage Frandsen & Ventus Publishing Aps
TB2. Step-By-Step Optimization With Excel Solver The Excel Statistical, Mark Harmon

COURSE OUTCOMES (COS):

Upon successful completion of the course a student will be able to

CO	Detailed Statement of the CO
CO1	Describe, understand word document and using it create reports.
CO2	Describe, understand excel for creating tables, writing formulas and generating charts.
CO3	Describe, understand PowerPoint and using it for presentation
CO4	Describe, understand MS-Access and using it to create database that could be further used as a backend of an application.
CO5	Understand how to use MS-Word, MS-Excel, MS-PowerPoint and MS-Access to work together and information can be shared.
CO6	To create and design spreadsheets, advertisement, visiting cards, invitation letters etc. in MS word and power point presentation.

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	2		2	1	1		1			1
CO2	3	1	2		2	1	1		1	1		
CO3	3	1	2		2	1	1		1		1	
CO4	3	1	2		2	1	1		1			
CO5	3	1	2		2	1	1		1			1
CO6	3		2				1				3	

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BS102**			
Course Name	**:Programming in 'C'**			
Semester /Year	**: 1st /1st**			
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- Understand the basics of Programming.
- Understand functional hierarchical code generation.
- Understand the usage of characters, string, integers and special symbols in programming.
- Understand loops and decision-making statements in order to solve problems.
- Understand arrays and implementation of various operations on arrays.
- Understand the use of functions and pointer in programming.
- Understand the use of structure &union.
- Understand file operations and implement file operation in C programming for a set of problems.

COURSE CONTENTS:

Unit 1 **[No. of Hours: 8]**

History, Introduction to C Programming Languages, Structure of C programs, compilation and executionof C programs. Debugging Techniques

Unit 2 **[No. of Hours: 8]**

Data Types and Sizes, Declaration of variables, Modifiers, Identifiers and keywords, Symbolic constants, Storage classes (automatic, external, register and static), Enumerations, command line parameters, Macros,The C Preprocessor

Unit 3 **[No. of Hours: 8]**

Operators: Unary operators, Arithmetic & logical operators, Bit wise operators, Assignment operators andexpressions, Conditional expressions, precedence and order of evaluation. Control Statements: if-else, switch, break, continue, the comma operator, go to statement. Loops: for, while, do-while.

Unit 4: **[No. of Hours: 8]**

Functions: built-in and user-defined, function declaration, definition and function call, parameter passing:call by value, call by reference, recursive functions, multi file programs.

Unit 5: **[No. of Hours: 5]**

Arrays: Linear arrays, multidimensional arrays, passing arrays to functions, Arrays and strings.

Structure and Union: Definition and differences, self-referential structure. And address of (&) operator, pointer to pointer, Dynamic Memory Allocation, calloc and malloc functions, array of pointers, function of pointers, structures and pointers.

Unit 6 **[No. of Hours: 5]**

File: File Handling in C

TEXT BOOKS:

TB1: Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
TB2.:Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2016.

REFERENCE BOOKS:

RB1.Gottfried, "Programming in C, Schaum's Series Tata McGraw

COURSE OUTCOMES:

CO1	Identify the need and use of programming in real world environment
CO2	Explain data types, variables and arithmetic operations in programming.
CO3	Apply the concept of functions and pointer. Resolve Real world problems using Functions and pointers.
CO4	Analyze array and String concepts and implement array and string using functions and pointers.
CO5	Appraise user defined data types including structure and union.
CO6	Create programs for all programming problems

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2						1				
CO2	2	2	2	3	1						1	
CO3	2	3	2	3	1		1	2	1			
CO4	2	2	2	3	1		1				1	
CO5		2	2	3	1		1	1				
CO6	2	3	3	3	1		1	1			2	

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Note:-BSME103 (One to be selected from BSME103A or BSME103B)

Course code	**: BSME103A**			
Course Name	**: Programming paradigm and Internet Technologies**			
Semester /Year	**: 1st /1st**			
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

1. Understand the basics of Programming Paradigms,
2. To learn the different categories of Programming languages
3. To be able to understand fundamentals of Computer network..
4. To learn various fundamental concepts on Internet and its prevailing technologies.

COURSE CONTENTS

UNIT-1 **[No. of Hours: 7]**

Basics of Programming
Program, Algorithm, Flow chart, software, System Software, Application Software
Program bug , debugging , Programming error: syntax error , logical error ,runtime error ,exception handling

UNIT-2 **[No. of Hours: 7]**

Basics of Programming Language
Category of language : High level language , Middle level language ,, Low level language ,**Types of Language :** Procedural programming , structured programming ,object oriented programming ,Event Driven programming, Web based programming ,App based programming language, embedded programming etc.
Language translators: Compiler , Assembler ,Interpreter ,Programming jargons: variable , constant ,operands ,operators ,data types, conditional statements ,iterative statements.

UNIT-3 **[No. of Hours: 7]**
Basics of Computer Network
Component of computer network, Mode of Communication, Data communication and Voice communication, digital and analog signal types of Network : LAN ,WAN, MAN, LAN topology, Guided and Non Guided Media ,IP address ,MAC address
Protocols of Computer Network: ARP , RARP, BOOTP, IP ,TCP , UDP, HTTP, HTTPS, FTP TFTP, POP, SMTP, DNS.

UNIT-4 **[No. of Hours: 7]**

Internet Technology
webpage ,static and dynamic webpage ,website , we server, hypertext ,hyper link , HTML, Scripting languages, URL, Downloading , uploading, search engine ,Browser, ISP ,Web hosting ,Domain and its registration ,Email ,MODEM, Broadband ,bandwidth.

TEXT BOOKS:

TB1. Programming Languages: Principles and Paradigms Maurizio Gabbrielli , Simone Martini .

TB2. Programming Language Pragmatics by Michael Scott

REFERENCE BOOKS:

RB1. Types and Programming Languages , by Benjamin The MIT Press.

COURSE OUTCOMES (CO):

CO-PO MAPPING:

	POI	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	2	2	1	1	1					
CO2	2	2	1	1	1	1	1					
CO3	1	2	2	2	1	1	1	1				
CO4	1	2	2	2	1	1	1					
CO5	2	1	1		1	1	1	2				

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BSME103B**			
Course Name	**: SYSTEM ANALYSIS & DESIGN**			
Semester /Year	**: 1st/1st**			
L	**T**	**P**	**C**	
3	**1**	**0**	**4**	

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To study different types of system and life cycle of system development.
- To learn roles of system analyst and different information gathering tools.
- To learn use tools for structured analysis, cost/benefit strategies and feasibility study.
- To learn process and stages of system design and form design.
- To learn system testing and quality assurance with proper hardware and software selection.

COURSE CONTENTS

Unit I **[No. of Hours: 6]**

System Concepts and Information System Environment- The System Concept, Definition, Characteristics of Systems, Elements of a System, Open and Closed and closed system, Formal and Informal Information Systems, Computer based Information Systems, Management Information System, Decision Support System

Unit 2 **[No. of Hours: 10]**

The System Development Life Cycle- Recognition of needs, Impetus for System Change, Feasibility Study, Analysis, Design, Implementation, Post implementation and Maintenance. The Role of the Systems Analyst, Academic and Personal Qualifications, Skills of System Analyst

Unit 3 **[No. of Hours: 12]**

Systems Planning and Initial Investigation- Strategies for Determining Information Requirement, Problem Definition and Project initiation, Background Analysis, Fact Analysis, Review of Written Documents, Onsite Observations, Interviews and Questionnaires, Fact Analysis, Performance Analysis, Efficiency Analysis, Service Analysis. Information Gathering- Kind of Information needed. Information about the firms, Information gathering tools, the art of Interviewing, Arranging the Interview, Guides to Successful Interview, Types of Interviews and Questionnaires, The Structured and Unstructured Alternatives.

Unit 4 **[No. of Hours: 8]**

The Tools of Structured Analysis- The Dataflow Diagram (DFD), Data Dictionary, Decision Table, Decision Trees and Structured English.

Unit 5 **[No. of Hours: 4]**

Input/Output and Forms Design- Input Design, CRT Screen Design, Output Design, Requirements form Design.

TEXT BOOKS:

TB1. Elias M.Awad, "Systems Analysis and Design" Galgotia Publication
TB2. System Analysis and Design Handbook: V. K. Jain, Wiley dreamtech

REFERENCE BOOKS:

RB1. Hoffer, "Modern Systems Analysis and Design" Addision Wesley
RB2. Kendall, "Introduction to System Analysis and Desogm", McGraw Hill

COURSE OUTCOMES (COS):

Upon successful completion of the course a student will be able to

CO	Detailed Statement of the CO
CO1	Defining the concept of system, analysis, design, and system analyst and system development life cycle.
CO2	Understand and describe the work done during the development of a system.
CO3	Apply the fact-finding techniques to collect information to generate the system's requirements for the development of a system constructs.
CO4	Analyze the system using data flow diagram, data dictionary and process specification tools to understand how each process is working and connected to others. Analyze the GUI, input/output screen and reports layouts.
CO5	Evaluate the system planning tools and techniques and testing of software projects to ensure its correctness and completeness.
CO6	Implement the newly developed system and giving training to the users.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	1			1				
CO2	2	3	2	2		2	3			1	1	1
CO3	1	3	2	3	1		1			1	2	1
CO4	2	3	1	3			2	1		1	2	1
CO5		1	1	1		2	1			1		
CO6	2	1		1	2	2	3	1		1	3	1

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BSOE104**			
Course Name	**: Fundamental of Computers & Information Technology**			
Semester	**: 1st /1st**			
	L	**T**	**P**	**C**
	2	**0**	**0**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- The main objective is to introduce Programming in a simple language to all undergraduate students,regardless of their specialization.
- It will help them to pursue specialized programs leading to technical and professional careers andcertifications in the IT industry.
- The focus of the subject is on introducing skills relating to computer basics, computer applications,programming, interactive medias, Internet basics etc

COUSE CONTENTS

UNIT 1 Introduction to Computers [No. of Hours: 10]

Generation of Computer, Hardware Components, Memory Devices, Magnetic Disk, Floppy Disk, Compact Disc/ DVD; Input Devices- Keyboard, Mouse, Scanner, OCR, OMR, MICR.

Output Devices- Printer, Types of Printer, Plotter, Monitor: CRT; Central Processing Unit, CPU ArithmeticLogic Unit, Control Unit, Instruction Set, Registers, Processor Speed, Type of Processors;

Memory- Main Memory Organization, Main Memory Capacity, RAM, ROM, EPROM, PROM, Cache Memory , Number Systems: Binary, Decimal, Octal, Hexadecimal, Binary Arithmetic, Character Codes(BCD), Excess-3, Gray Code, ASCII

UNIT 2 –System Software and Application Software [No. of Hours: 12]

System software, utility packages, compilers, interpreters, Operating Systems, Elementary Commands of DOS, Booting. Application software's– word-processing, spreadsheet, presentation graphics,Data Base Management Software, Characteristics, Virus- working, features, types of viruses, virus detection prevention and cure.

TEXT BOOKS:

TB1. Raja Raman V: Fundamentals of Computers

REFERENCE BOOKS:

RB1. Sanders D.H: Computers Today

COURSE OUTCOMES:

After completion of the course, a student will be able to

CO	DESCRIPTION
CO1	To understand the fundamentals of Computers, Block Diagram of Computer, Computer hardware, Memory Architecture, to perform conversion from one number system to another number system.
CO2	Will be able to analyze software, to identify type of software, to know the concept of Operating System and Functions of Operating System, to memorize the variouscommands of different Operating System.
CO3	Students will be able to know concept of networking, Networking based reference model, Internet and different term related to internet. Different types of protocolsassociated with internet.
CO4	Will be able to get idea about what is program and program paradigms, to developstrategies behind designing a program, to know the structure i.e. Top-Down and Bottom-Up approach of Modular Programming.
CO5	Will be able to learn about different generations of Programming language, to knowdifferent methodologies to solve computation task,
CO6	To create and design algorithm suitable flow chart of different problems

CO-POMAPPING:

CO	PO I	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
CO1	3	1	1			1	1					
CO2	1	3	2	2	1		1					
CO3	2	2	1	1		1						
CO4		2	3	1	1	3	1					
CO5	1	3	2	2	1		1					
CO6	1	2	2	1	1		1					

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BSVC105**			
Course Name	**:Basic Mathematics**			
Semester	**: 1st /1st**			
L	**T**	**P**	**C**	
2	**1**	**0**	**3**	

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To study the concept of functions.
- To apply various methods to solve the problems.
- To find the concept of function from relation.
- To study probability and solve various real life problems
- To study the matrices and its types.

COURSE CONTENTS:

Unit 1 Differentiation and Integration: [No. of Hours: 10]

laws of derivative chain rule differentiation using log, repeated derivatives, Integration of algebraic,logarithmic and exponential functions,

Unit 2 Relation, Function & Induction: [No. of Hours: 10]

Type and compositions of relations , Pictorial representation of relations, Equivalence relations, Partialordering relation. Types of Function, Composition of function, Recursively defined function, Piano's axioms, Mathematical Induction.

Unit 3 Prepositional Logic: [No. of Hours: 10]

Preposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates andquantifiers, Possets, Hasse Diagram.

Unit 4 Probability and Matrices: [No. of Hours: 12]

Mathematical and statistical probability, axiomatic approach to probability, Law of addition of probability,dependence of events, Baye's Theorem.

Introduction and definition of matrices, types of matrices, matrix addition and scalar multiplication,transpose and inverse of matrix.

TEXT BOOKS:

TB1. Text Book of Engineering Mathematics ,Mr. N.P. Bali.

REFERENCE BOOKS:

RB1. Higher Engineering Mathematics, B.S. Grewal

COURSE OUTCOMES:

CO	DESCRIPTION
CO1	Define the differentiation and integration of functions.
CO2	Understand the various concepts of relations and functions like recursively definedfunctions.
CO3	Teach to use mathematical induction to solve various linear and non-linear problems.
CO4	Analyze posset and Hasse diagrams and solve various types of logic by usingprepositional logic.
CO5	Evaluate basic concepts of Probability and its application including Baye's Theorem
CO6	Design and explain the basic operations of matrices and to solve the problems ofmatrices.

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CO –PO MAPPING

CO	POI	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2
CO1	3	2	3	1	1	1	1				2	
CO2	3	1	3	2	2	1	3	1				
CO3	3	2	1	1		2	1		2		2	
CO4	2	1	2	2	1	2	3	1		2	1	
CO5	3	3	3	1	2	1	3	2			2	2
CO6	3	2	1	2	3	1	3	2	1	2	1	2

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BSCC106				
Course Name : Environmental Studies				
Semester : 1st /1st				
	L	**T**	**P**	**C**
	2	**-**	**-**	**-**

- Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To develop a comprehensive understanding of various facets of life forms and ecological processes.
- To gain the knowledge of how natural resources relate today to the economy and environment.
- To aware about the problem of environmental pollution and to learn about the various methods andprocesses by which pollution can be controlled.

COURSE CONTENTS

UNIT 1: Introduction to environmental studies and Ecosystems

[NO OF HRS 8]

Definition of environment Multidisciplinary nature of environmental studies;, Scope and importance;Concept of sustainability and sustainable development. What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains,food webs and ecological succession.

Unit 2: Natural Resources

[NO OF HRS 8]

Natural resources and their type Land resources and land use change; Land degradation, soil erosion and desertification, Deforestation: Causes and impacts due to mining, dam building on environment Water : Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international& inter-state)., Energy resources : Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

UNIT 3: Environmental Pollution and Environmental Laws

[NO OF HRS 8]

Environmental pollution: types, causes, effects and controls; Nuclear hazards and human health risks, Solidwaste management: Control measures of urban and industrial waste, Pollution case studies.
Climate change, global warming, greenhouse effect ozone layer depletion, acid rain and impacts onhuman communities and agriculture.

Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. Internationalagreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD)

UNIT 4: Biodiversity and Conservation &Human Communities and the Environment

[NO OF HRS 8]

Definition of biodiversity Levels of biological diversity: genetic, species and ecosystem diversity; Bio geographic zones of India; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Human population growth: Impacts on environment, human health and welfare, Resettlement and rehabilitation of project affected persons; Disaster management: floods, earthquake, cyclones and landslides, Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan., Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. Case studies (e.g.,CNG vehicles in Delhi).

TEXT BOOKS:

TB1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha

REFERENCE BOOKS:

RB2.Fundamental Concept in Environmental Studies by Dr. D.D Mishra

COURSE OUTCOMES:

Upon successful completion of the course a student will be able to

CO1	To gain and **remember** the knowledge of different aspects of environmental science
CO2	To **understand and explain** about protection of wildlife and other natural resources..
CO3	To gain and **apply** the knowledge about the different control technologies and awarenessprograms regarding environment.
CO4	To appreciate the ethical, cultural and historical context of environmental issues and to understand the **relationship** between human and natural system.
CO5	To identify, **evaluate** and solve environmental problems by utilizing the concept ofenvironmental studies.
CO6	To **design and create** various policies and practices for environment protection.

CO PO MAPPING:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
CO1	3	2	1	1	2	1	3	-	2	3	2	2
CO2	2	3	3	2	3	1	3	-	3	2	2	2
CO3	3	3	3	3	3	2	2	2	3	3	-	-
CO4	1	1	2	2	2	2	1	2	1	3	-	-
CO5	3	3	1	1	2	-	2	1	1	3	-	-
CO6	1	2	3	3	2	2	-	1	-	3	3	2

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BSP11**			
Course Name	**: LAB-Office Automation**			
Semester	**: 1st /1st**			
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

1. To provide understanding of DTP Skills.
2. To provide insight into various office automation Tools like t ,MS Access ,MS word ,MS excel ,MS power Point.

COURSE CONTENTS

UNIT1 **DOS** &**MS WORD** **[NO OF HRS 8]**

Internal and External DOS Commands, Windows Operating System Interface and Utility programs

Making table , inserting page Numbers date and time ,subscript and super script , Inserting Word art ,clipart, Textbox, inserting Mathematical equation and symbol, pictures, clipart ,shapes, charts, book mark, Hyperlink, Header Footer.

Page layout:

Setting Margins, orientation, watermark page colon, page Border, line spacing Alignments, Rotation of Text, effects and theme, **Review:** spell check , check grammar, Translate, protecting document **View:** print layout, web layout, view ruler, macro, split screen ,multipage view.

UNIT 2 MS-**EXCEL** **[NO OF HRS 8]**

Creating & Opening Spreadsheet, , Formula Editing, Formatting, Spreadsheet types. setting Margins, Referring Cells, Highlighting values, Find, Search & replace, Inserting Column, rows & sheets, inserting Symbols, Data from external files, Frames, Clipart, Pictures, Files etc, Inserting Functions, Manual breaks, Setting Formula-finding total in a column or row, Mathematical operations (Addition, Subtraction, Multiplication, Division, Exponentiation), Using other Formulae. Creating Charts -Drawing. Printing.

UNIT 3 MS-POWER POINT **[NO OF HRS 8]**

Different presentation templates, setting backgrounds, selecting presentation layouts. -Setting Presentation style, Adding text to the Presentation. Formatting a Presentation-Adding style, Colour,

gradient fills, Arranging objects, Adding Header & Footer, Slide Background, Slide layout. Adding Graphics to the Presentation-Inserting pictures, movies, tables etc into presentation, Drawing Pictures using Draw. Adding Effects to the Presentation-Setting Animation & transition effect. Printing Handouts, Generating Standalone Presentation viewer.

UNIT 4 **MS-ACCESS** **[NO OF HRS 8]**

Creating a New Database, Creating Tables, Working with Forms, Creating queries, Finding Information in Databases, Creating Reports, Types of Reports, Printing & Print Preview–Importing data from other databases viz.MS Excel etc.

Web Browser And E-mail

COURSE OUTCOMES (COS):

Upon successful completion of the course a student will be able to

CO#	Detailed Statement of the CO
CO1	Describe the basics of computer
CO2	Apply word processing techniques
CO3	Implement word processing using spread sheets
CO4	Analyse the problem-solving techniques
CO5	Apply factoring and array techniques in real time
CO6	To create and design spreadsheets , advertisement ,visiting cards ,invitation letters etc. in MS word and power point presentation

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2			1						
CO2	3	3	2	2								
CO3	3	3	2		1							
CO4	2	3	3									
CO5	3	3	3			2						

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BSP12				
Course Name : LAB - PROGRAMMING IN C				
Semester /Year : 1st /1st				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES: The objectives of this course are

- Understand the basics of Programming.
- Understand functional hierarchical code generation.
- Understand the usage of characters, string, integers and special symbols in programming.
- Understand loops and decision-making statements in order to solve problems.
- Understand arrays and implementation of various operations on arrays.
- Understand the use of functions and pointer in programming.
- Understand the use of structure & union.
- Understand file operations and implement file operation in C programming for a set of problems.

COURSE CONTENTS:

1. Programs based on variables
2. Programs based on conditional
3. Programs based on loops
4. Programs based on arrays
5. Programs based on strings
6. Programs based on functions
7. Programs based on pointers
8. Programs based on structure and union
9. Programs based on file handling

TEXT BOOKS:

TB1: Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.
TB2: ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.

REFERENCE BOOKS:

RB1: Gottfried, "Programming in C, Schaum's Series Tata McGraw

COURSE OUTCOMES:

Upon successful completion of the course as a student will be able to

CO1	Identify the need and use of programming in real world environment
CO2	Explain data types, variables and arithmetic operations in programming.
CO3	Apply the concept of functions and pointer. In addition, resolve real world problems using functions and pointers.
CO4	Analyze Array and String concepts and implement array and string using functions and pointers.
CO5	Appraise user defined data types including structure and union.
CO6	Create programs for all programming problems

CO PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2						1				
CO2	2	2	2	3	1					1		
CO3	2	3	2	3	1		1	2			2	
CO4	2	2	2	3	1		1					
CO5		2	2	3	1		1	1		2		1
CO6	2	3	3	3	1		1	1				

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

SECOND SEMESTER:

Course code : BS201				
Course Name : Operating System				
Semester /Year : 2nd /1st				
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To understand various operating system types, Architecture design of OS and their services.
- To study process management concepts and various scheduling algorithm.
- To understand process synchronization concepts and deadlock handling mechanism.
- To learn various memory management schemes.
- To study file management and Disk management techniques

COURSE CONTENTS:

UNIT 1 **No of Hrs 6 Hr**

Introduction: Operating System- Definition, Types of OS- Simple batch system, Time sharing
systems, Real time systems, Multiprocessor systems, Distributed systems, System components -OS Services, System Calls.

UNIT 2 **No of Hrs 10 Hr**

Process concepts: PCB, Process Scheduling, Operations on Processes, Co-operating process
IPC , Threads- Overview, Benefits, User & Kernel Threads.
CPU Scheduling: Scheduling criteria , Preemptive & Non-preemptive scheduling, Scheduling
Algorithms

UNIT 3 **No of Hrs 8 Hr**

Process Synchronization: Background, Critical Section problem, Critical Regions, Synchronization, hardware, Semaphores, Classic Problems of Synchronization
Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection and Recovery from

Deadlock.

UNIT 4 No of Hrs 8Hr

Memory Management: Logical vs. Physical address space, Swapping, Contiguous memory
allocation, Non-Contiguous memory allocation- Paging, Segmentation, Segmentation with paging.
Virtual Memory: Background, Demand paging - Performance, Page replacement, Page replacement algorithms (FCFS, LRU), Allocation of frames, Thrashing.

UNIT 5 No of Hrs 8 Hr

File Systems: File concept, access methods, Allocation methods-contiguous, linked and index
allocation, Directory System – single level, tree structured, acyclic graph and general graph
directory, File protection.
Disk Management: Secondary storage structure: Disk structures, Disk Scheduling, Disk reliability.

TEXT BOOKS:

TB1. MilankovicM "Operating System concepts and Design", 2nd edition, Tata Mcgraw Hill.

REFERENCE BOOKS:

RB1. Abraham Silberschatz, Peter Baer Galvin & Greg Gagne , "Operating System Concepts", Sixth Edition, John Wiley & Sons, Inc.

COURSE OUTCOMES:

Upon successful completion of the course as a student will be able to

CO	DESCRIPTION
CO1	To understand & remember different OS types and basic component of OS Architecture.
CO2	Analyze issues in process management and evaluations of various scheduling algorithms.
CO3	Understand process synchronization problem and provide (create) solution for critical section Problem and deadlock management.
CO4	Analyze and understand various memory management techniques.
CO5	Identify or evaluate the use of storage management techniques and solve various disk scheduling problems.

CO-POMAPPING:

	PO											
CO	PO I	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO1 2
CO1	3	1			1	1						
CO2	1	3	1	2	1							
CO3	2	3		2	1	1		1				
CO4	1	2	2	1		2	1					
CO5		3	1	2	1	2		1				

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BS202				
Course Name : Data Structure Using C				
Semester /Year : 2nd /1st				
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES: The objectives of this course are

1. To understand basics knowledge of data structure operations, algorithms and their application.
2. To design and implement algorithms and data structure operations using C program.
3. To learn various techniques for representation of the data in nonlinear fashion
4. To learn advance concept of searching
5. To understand basics of file organization and graphs.

COURSE CONTENTS:

Unit I **[No. of Hrs:6]**

Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off.
Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered list, Sparse Matrices.

UNIT 2 **[No. of Hrs: 8]**

Linked Lists: Representation and implementation of Singly linked lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List of Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

UNIT 3 **[No. of Hrs:8]**

Stacks: Array Representation and Implementation of stack, Operations and Stacks: Push

and POP, Array Representation of Stack, Linked Representation of stack, Operations Associated with Stacks, Application of stack, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack. Recursion: Recursive definition and processes.
Queues: Array and linked representation and implementation of queues, Operations on Queue; Create, Add, Delete, Full and Empty, Circular queue,

Unit 4 **[No. of Hrs:10]**

Trees: Basic terminology, Binary Tree, Binary tree representation algebraic Expressions, Complete Binary Tree, Extended Binary Tree, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees. Traversing Threaded Binary tree, Huffman algorithm, Binary Search (BST), Insertion and Deletion in BST.

Unit 5 **[No. of Hrs:8]**

Sorting ,Searching and Hashing: Selection sort, Insertion Sort, Bubble sorting, Quick Sort, Merge Sort Sequential and Binary searching, comparison and analysis, Hash Table, Hash Function, Collection Resolution Strategies.

TEXT BOOKS:

TB1: Horowitz and Sahani, "Fundamentals of data Structures" Galgotia
TB2: R. Kruse etal, "Data Structures and Program Design in C" Person Education

REFERENCE BOOKS:

RB1: A.M. Tenenbaumetal, "Data Structures and Program Design in C" Person Education
RB2: Lipschutz, "Data Structure", TMH
RB3: K Loudon, "Mastering Algorithms With C", Shroff Publishers and Distributors

COURSE OUTCOMES (COS):

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

CO	Detailed Statement of the CO
CO1	Understand basics knowledge of data structure operations like insertion, deletion etc. for various data structure and their application.

CO2	Analyze the problem and create appropriate algorithm.
CO3	Develop and implement various programs using C for nonlinear data structure.
CO4	Investigate and solve difficulties in the implementation of searching techniques.
CO5	Know application file and graphs in real world.

PO CO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2			2	1	1					
CO2		3	2	1	2	1						
CO3	1	1	3		1		1					
CO4		2	2	3	2		1					
CO5	1		2	1	1	1						

1 – Highest Correlated ,2 – Medium Correlated, 3 – Low Correlated

Major Elective (Any one to select from BS-ME203A or BS-ME203B)

Course code : BS-ME203A				
Course Name :Cloud Computing				
Semester :2nd/1st				
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES: The objectives of this course are

1. To explore Cloud Computing Basic concept and its applications.
2. To understand Virtualization and its role in the implementation of cloud computing.
3. To Data center overview and its architecture.
4. To demonstrate popular public clouds and their features.
5. To discuss security issues in cloud and available countermeasures.

COURSE CONTENTS:

UNIT 1 **[No. of Hours: 8]**

IntroductiontoCloudComputing: Definition,Evolution&Characteristics,Service Models of cloud computing Iaas, PaaS, SaaS and their Comparisons, Issues & Challenges of Cloud Computing, Applications of Cloud computing, Overview of Cloud Computing Security Configurations.

Cloud Computing Architecture: Introduction, Cloud Architecture, Deployment of Models (Public, Private, Community, and Hybrid Clouds) and their comparisons, IDaaS, Over View of Data intensive computing through Map Reduce.

Unit 2 **[No. of Hours: 8]**

Virtualization in Cloud: Virtualization, Implementation of Virtualization, Middleware SupportforVirtualization, Advantages & Applications of Virtualization, Virtualization Implementation Techniques, Hardware Virtualization, Types of Virtualization.

Unit 3 **[No. of Hours: 8]**

Data Centre Architecture and Technologies:
Architectural Building Blocks of Data Centre, Industry Direction and Operational and Technical Phasing, Industry Direction and Overview of Operational and Technical Phasing.

Unit 4 **[No. of Hours: 10]**

Computing with Titans:
Google, Microsoft, Amazon, IBM, Accessing the Cloud-Platforms through a brief overview of Web Applications, Web API's,Web Browsers.

Implementation of Cloud Using Any Cloud Platform :Introduction to Web Services, Structure, Objective, Cloud Portals, Groups, Mobile Apps, Setting up of Cloud Services, Containers, Handling Cloud Shell, Setting up of projects, Building Virtual Infrastructure, Deployment of Virtual Machine, Configuring Load Balancing.

Unit 5 **[No. of Hours: 6]**
Security Issues in Cloud Computing: Introduction, Security Challenges in Cloud Computing, Information Security, Privacy and Trust in Cloud Computing.

TEXT BOOKS:

TB1. V.K.Pachghare, Cloud Computing, PHI Learning, 1st Edition,2016.
TB2. Venkata Josyula,MalcomOrr,Greg Page,"Cloud ComputingAutomating theVirtualized DataCenter", Cisco Press, 1st Edition,2016.
TB3. TobyVelte,Anthony Velte, Robert Elsenpeter, "Cloud Computing Practical Approach", McGrawHill,1st Edition,2015.

REFERENCE BOOKS:

RB1. ErlThomas,PuttiniRicardo,MahmoodZaigham,"CloudComputing-Concepts, Technologyand Architecture",PearsonIndia,1st Edition,2014.SrinivasCheemalaptiYi-an Chang, Shahir Daya, Matthieu Debeaux, Odilon
RB2. Magroski Goulart, VasfiGucer, Rahul Gupta, Shamim Hossain, David Kwock, JordanT Moore, David N Nguyen, Bobby Woolf, "Hybrid Cloud Data and API

Integration:IntegrateYourEnterpriseandCloudwithBluemixIntegrationServices ”,IBMRedbooks,2nd Edition,2016.

COURSE OUTCOMES:

After completion of the course, a student will be able to

CO1	To understand Cloud Computing concepts, classifications, and the basic cloud architecture. Exploring various Cloud services and applications currently used in industry.
CO2	Understanding abstraction and virtualization techniques. And Security in the cloud computing environment.
CO3	AnalyzetheconceptofDataCentreswithCloudComputingandexaminethe Usecases
CO4	Exploring major Cloud service platforms currently ruling the industry.
CO5	To have knowledge on various standards used and cloud security features.

CO PO MAPPING:

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2	2		1			1		
CO2	2	3		3	3							
CO3	3		2		2		2			1		
CO4	3	3		3	2							1
CO5	1	1	1	1	1		1					

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BSME203B				
Course Name : ARTIFICIAL INTELLIGENCE				
Semester /Year : 2nd / 1st				
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- To impart knowledge about Artificial Intelligence.
- To give understanding of the main abstractions and reasoning for intelligent systems.
- To enable the students to understand the basic principles of Artificial Intelligence in various applications.

COURSE CONTENTS

Unit 1 **[No. of Hours: 10]**

Introduction to Artificial Intelligence, Simulation of sophisticated & Intelligent Behavior in different area problem 3OIving in games, natural language, automated reasoning, visual perception, heuristic algorithm versus solution guaranteed algorithms.

Unit 2 **[No. of Hours: 10]**

Understanding Natural Languages.Parsing techniques, Context free and transformational grammars, transition nets, augmented transition nets, Fillmore's grammars, Shanks Conceptual Dependency, grammar free analyzers, sentence generation, and translation.

Unit 3 **[No. of Hours: 10]**

Knowledge Representation, First order predicate calculus, Horn Clauses, Introduction to PROLOG, Semantic Nets, Partitioned Nets, Minskey frames, Case Grammar Theory, Production Rules Knowledge Base, the Interface System, Forward & Backward Deduction.

Unit 4 **[No. of Hours: 5]**

Expert System Existing Systems (DENDRAL, MYCIN), Inference Engine, domain exploration Meta Knowledge, Expertise Transfer, Self Explaining System.

Unit 5 **[No. of Hours: 5]**

Introduction to Pattern Recognition, Structured Description, Symbolic Description, Machine perception, Line Finding, Interception Semantic & Model, Object Identification, Speech Recognition. Programming Language; Introduction to programming Language, LISP, PROLOG.

TEXT BOOKS:

TB1. Winston, "LISP", Addision Wesley.
TB2.Marcellous, "Expert System Programming", PHI.
TB3.Elamie, "Artificial Intelligence", Academic Press.

REFERENCE BOOKS:

RB1.Elamie, "Artificial Intelligence", Academic Press.
RB2. Winston, "LISP", Addision Wesley.

COURSE OUTCOME (CO):

On completion of the course the student should be able to:

CO	DESCRIPTION
CO1	Solving basic AI problems and developing understanding of where and how AI can be used.
CO2	List the objectives and functions of modern Artificial Intelligence.
CO3	Define the concept of Artificial Intelligence.
CO4	Ability to Apply AI techniques to real-world problemssolving to develop intelligent systems.

CO5	Select appropriately from a range of techniques when implementing intelligent systems.
CO6	Use classical Artificial Intelligence techniques, such as search algorithms, min max algorithm, alpha beta pruning etc.

CO PO MAPPING:

CO	PO											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		3	1	2	3	1	3	1	3	3	3	1
CO2		1	1	1	1	2	3	1	2	3	1	1
CO3						1	3	1	2	3	1	1
CO4	3	3	3	3	3	1	3	2	2	3	2	3
CO5	3	3	3	3	3	1	2	1	3	3	3	3
CO6	3	3	3	2	2	2	3	2	2	2	2	3

Course code	**: BSOE204**			
Course Name	**:Advance Fundamental of Computers & Information Technology**			
Semester	**: 2nd/1st**			
	L	**T**	**P**	**C**
	2	**0**	**0**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- The main objective is to introduce Programming in a simple language to all undergraduate students, regardless of their specialization.
- It will help them to pursue specialized programs leading to technical and professional careers and certifications in the IT industry.
- The focus of the subject is on introducing skills relating to computer basics, computer applications, programming, interactive Medias, Internet basics etc.

COURSE CONTENTS

UNIT 1: PROGRAMMING LANGUAGES AND ALGORITHMS

[NO OF HRS 8HR]

Generation of Languages: Machine language, Assembly languages, High level languages, Language translators (Compiler, Interpreter, Assembler) , Syntax error, Logical error, runtime error, General concepts of OOPS (Object oriented programming), Structured Query Language algorithm development, techniques of problem solving- Flowchart, Pseudo-code, Decision trees,

Programming paradigms: Top-down, bottom-up etc.

UNIT 2: COMPUTER NETWORK & COMMUNICATION TECHNOLOGIES

[NO OF HRS 8HR]

Communication system elements, communication modes (simplex, half duplex and full duplex analog and digital, synchronous and Asynchronous, Communication media: wired and wireless, LAN, WAN, MAN, network topologies,

TEXT BOOKS:

TB1. Raja Raman V: Fundamentals of Computers

REFERENCE BOOKS:

RB1. Sanders D.H: Computers Today

COURSE OUTCOMES:

CO	DESCRIPTION
CO1	To Understand the fundamentals of Computer such as Block Diagram of Computer, Computer Hardware, Memory Architecture, to perform conversion from one number system to another number system.
CO2	Will be able to analyze software, to identify type of software, to know the concept of operating System and Functions of Operating System, to memorize the various commands of different Operating System.
CO3	Studentswillbeabletoknowconceptofnetworking,Networkingbasedreferencemodel,Internetanddifferenttermrelatedtointernet.Differenttypesofprotocolsassociatedwithinternet.
CO4	Will be able to get idea about what is program and program paradigms, to develop strategies behind designing a program, to know the structure i.e. Top-Down and Bottom-Up approach of Modular Programming.
CO5	Willbeabletolearnaboutdifferentgenerationof Programminglanguage,toknowdifferentmethodologiestosolvecomputationtask,usingappropriateandsuitableflowchartandalgorithm.

CO-POMAPPING:

PO	PO											
CO	POI	PO 2	PO3	PO4	PO5	PO 6	PO7	PO8	PO9	PO1 0	PO11	PO12
CO1	3	1	1			1	1					
CO2	1	3	2	2	1		1					
CO3	2	2	1	1		1						
CO4		2	3	1	1	3	1					
CO5	1	3	2	2	1		1					

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course Name	**: CYBER SECURITY AND CYBER LAW**			
Semester /Year	**: 2nd/ 1st**			
	L	**T**	**P**	**C**
	2	**1**	**0**	**3**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- Learn the foundations of Cyber Security and threat landscape.
- To equip students with the technical knowledge and skills needed to protect and defend against cyber threats.
- To develop skills in students that can help them plan, implement, and monitor cyber security mechanisms to ensure the protection of information technology assets.
- To expose students to governance, regulatory, legal, economic, environmental, social and ethical contexts of Cyber Security.
- To expose students to responsible use of online Social media network.
- To systematically educate the necessity to understand the impact of cybercrimes and threats with solutions in a global and societal context.
- To select suitable ethical principles and commit to professional responsibilities and human values and contribute value and wealth for the benefit of the society

COURSE CONTENTS

UNIT 1 Introduction to Cyber Security [No. of Hours: 6]

Defining Cyberspace and Overview of Computer and Web-technology, Architecture of cyberspace, Communication and web technology, Internet, World Wide Web, Advent of internet,
Internet infrastructure for data transfer and governance, Internet society, Regulation of cyberspace, Concept of Cyber Security, Issues and challenges of Cyber Security.

UNIT 2 Cybercrime and Cyber law [No. of Hours: 8]

Classification of cybercrimes, Common cybercrimes - cybercrime targeting computers, cybercrime against woman and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks., Reporting of cybercrimes, Remedial and mitigation measures, Legal perspective of cybercrime, IT Act,2000 and its amendments, Cybercrime and offences, Organizations dealing with Cybercrime and Cyber Security in India, Case studies

UNIT 3 Social Media Overview and Security [No. of Hours: 10]

Introduction to Social networks. Types of Social media, Social media platforms, Social media monitoring, Hashtag, Viral content, Social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media, Case studies

UNIT 4 E-Commerce and Digital Payments [No. of Hours: 8]

Electronic Commerce definition, Main components of E-Commerce, Elements of E-Commerce security, E-Commerce threats, E-Commerce security best practices, Introduction to digital payments, Components of digital payment and stake holders, Modes of digital payments- Banking Cards, Unified Payment Interface (UPI), e-Wallets, Unstructured Supplementary Service Data (USSD), Aadhar enabled payments, Digital payment related common frauds and preventive measures. RBI guidelines on digital payment and customer protection in unauthorized banking transactions. Relevant provisions of Payment settlement Act, 2007.

UNIT 5 Digital Devices Security, Tools and Technologies for Cyber Security [No. of Hours: 8]

End Point device and Mobile phone security, Password policy, Security patch management, Data backup, Downloading and management of third party software, Device security policy, Cyber Security best practices, Significance of host firewall and Ant-virus, Management of host firewall and Anti-virus, Wi-Fi security, Configuration of basic security policy and permissions.

TEXT BOOKS:

TB1. Cyber Crime Impact in the New Millennium, by Marine R. C, Auther Press.
TB2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by SumitBelapure and Nina Godbole, Wiley India Pvt. Ltd.

REFERENCE BOOKS:

RB1. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform.
RB2. Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
RB3. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
RB4. Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
RB5. Fundamentals of Network Security by E. Maiwald, McGraw Hill.

COURSE OUTCOMES (COS):
After completion of the course, a student will be able to

CO	Detailed Statement of the CO
CO1	Define a deeper understanding and familiarity with various types of Cyber-attacks, cybercrimes, vulnerabilities and remedies thereto.
CO2	Understand and evaluate existing legal framework and laws on Cyber Security.
CO3	Use the security aspects of social media platform and ethical aspects associated with use of social media.

CO4	Analyse and evaluate the digital payment system security and remedial measures against digital payment frauds.
CO5	Analyze and evaluate the Digital devices security and cyber security risks.
CO6	Create Cyber Security Practices and Configuration of basic security policies and permissions.

CO-PO MAPPING:

	POI	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3		1	1	1	1				2	1	
CO2	2									2	1	
CO3	2	1			3	2				2	1	
CO4	2	1			1	2				2		
CO5	2									2	1	

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:**	**BSCC206**			
Course Name	**:**	**Professional Communication**			
Semester /Year	**:**	**2nd /1st**			
		L	**T**	**P**	**C**
		2	**0**	**0**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES:

- Students will heighten their awareness of correct usage of English grammar in writing and speaking
- Students will improve their speaking ability in English both in terms of fluency and comprehensibility
- Students will give oral presentations and receive feedback on their performance

UNIT 1 Elementary English [No of Hrs: 7 Hrs]

Grammar: Parts of Speech, Tenses, Short responses, Active and Passive Voice
Vocabulary: Idioms and Phrases, Antonyms, Synonyms, One word substitution
Writing skills: Formal and Informal Letters

UNIT 2 Employability skills [No of Hrs: 7 Hrs]

Communication: Types, Objectives, Formal and Informal Communication, Barriers to communication, Selection of appropriate communication medium, Verbal and Non- verbal Communication
Soft Skills: Public Speaking, Presentation Skills, Speech, Debates, Emotion Management

UNIT 3 Career Skills [No of Hrs: 7 Hrs]

Interviews, CV Preparation, Group discussion, Personality Development

TEXT BOOKS:

TB1. Fluency in English - Part II, Oxford University Press, 2006.
TB2. Business English, Pearson, 2008.

REFRENCE BOOKS

RB1. Language, Literature and Creativity, Orient Blackswan, 2013.
RB2. Bussiness Communication: Rajender Paul

COURSE OUTCOMES:

Upon successful completion of the course a student will be able to

CO1	Students will attain and enhance competence in the four modes of literacy: writing, speaking, reading and listening
CO2	Students will develop their ability as critical readers and writers
CO3	Develop vocabulary and improve the accuracy in grammar.
CO4	Produce words with right pronunciation
CO5	Demonstrate positive group communication exchanges
CO6	Plan effective communications

CO-PO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2	1	2										
CO3	2	2	1		2							
CO4	1			2			2					
CO5	1								3			
CO6	2	2	2	1	1		1		3			

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BSP21				
Course Name : UNIX LAB				
Semester : 2nd /1st				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are
Describe the basic file system in Linux and its file attributes. 2. Appraise different filters, process handling, regular expressions and network handling features using suitable commands. 3. Summarize different Linux commands to write Shell Programs.

List of Experiments

PART-A

1. Introduction- Unix Architecture- Shell, Kernel, System calls.
   Comparison between Unix/Linux and other Operating Systems, Applications of Linux Operating System.
2. Internal & External commands in Linux.
   - Internal commands- echo, type, etc.
   - External commands- ls, cp, mv, rm, cat, etc
   - Other commands – tput clear, who, cal, date, bc, man, passwd, uname (with different options).
3. Working with files & directories.
   - Know the categories of files.
   - Directory related Commands – pwd, mkdir, rmdir, cd, ls
   - Manipulating Absolute paths and Relative paths using cd command.
   - File related Commands – cat, cp, mv, rm, comm, cmp, diff, tar, umask, wc
4. Basic File attributes.
   - Listing seven attributes of a file : ls and its options

- File Permissions: Absolute and Relative permissions
- Manipulating File permissions using chmod command
- Manipulating File Ownership using chown command
- Manipulating Hardlink and Softlink using ln command

5. Learn to use vi editor.

Three modes of vi editor.

- Input mode commands.
- Command mode commands.
- Ex mode commands.

6. Simple Filters – head, tail, cut, paste, sort, uniq, tr, pr.

7. Expressions & search patterns .(dot operator), *, ^, +, ?, grep, egrep, fgrep

8. Process Management commands.

- Process creation, status, Identifying process, ps -f & its options,
- Running process in background, Job control, and Process termination.
- Changing process priority, scheduling process (Usage of sleep and wait commands)

9. Introduction to shell programming.

- Introduction, Uses of shell script, Shell special characters, comments, command separator, escaping, quoting command substitution.
- Creating shell script, Shell identifiers, Shell variables, Destroying a variable, Positional parameters & command line arguments.
- Evaluating expressions, Text formatting with echo & tput script termination.

10. Shell control structures

- if, case, for, while, relational and logical operators,
- Advanced filter – sed and awk.

11. Unix system administration Managing file system, Disk management utilities, mounts, umount, df, du, fdisk, su, useradd etc.

12. Unix Environment Introduction, Environment variables, Command prompt system variables, Profiles, files, terminal variable stty command and its options, Command history, editing Environment variable.

PART-B

13. Write a shell script to display current date, time, username and directory.

14. Write script to determine whether given file exist or not, file name is supplied as command line argument, also check for sufficient number of command line argument

15. Write shell script to show various system configuration like: a) Currently logged user name and his long name b) Current shell c) Your home directory

16. Write shell script to show various system configuration like: a) Your operating system type b) Your current path setting c) Your current working directory d) Show all available shells

17. Write a Shell script to accept any two file names and check their file permissions.

18. Write a Shell script to read a file name and change the existing file permissions.

19. Write a shell script to print current month calendar and to replace the current day number by '*'or '**' respectively.

20. Write a C-program to fork a child process and execute the given Linux commands.

21. Write a C-program to fork a child process, print owner process ID and its parent process ID.

TEXT BOOKS:

TB1. "UNIX - Concepts and Applications", Sumitabha Das 4th Edition, Tata McGraw Hill, 2006.

TB2. Stephan Prata: Advanced Unix – A Programmers Guide – BPB PUB.

REFERENCE BOOKS:

RB1. http://heather.cs.ucdavis.edu/~matloff/Linux/LinuxInstall.pdf (Chapter 1, Linux installation).

RB2. Kernighlan & Pike : The Unix Programming Environment – PHI.

COURSE OUTCOMES :

Upon successful completion of the course a student will be able to

CO1	Able to understand the basic Unix architecture, commands and utilities of the UNIX operating system and to work confidently in Unix/Linux environment and open systems.
CO2	Appraise various command usage of files and directories
CO3	Show the working of vi editor in all its modes using various commands.
CO4	Manage shell and processes using various commands.
CO5	Write Shell scripts and C programs using vi editor. Demonstrate Unix administration and its environment.
CO	To Create Shell Scripting Programs

CO-PO MAPPING:

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1		1		2	2					3
CO2	1	2	3	2	3	1	1	1			1	1
CO3	3	1		2		2	2					3
CO4	2	1	1	2	2	1	2	1				2
CO5	1	2	2	1	3	2	2				1	1
CO6	1		2		3			3				

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BSP22**
Course Name	**: Data Structure Lab**
Semester /Year	**: 2nd /1st**

	L	T	P	C
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

COURSE OBJECTIVES: The objectives of this course are

1. To learn basic knowledge about data structure and arrays.
2. To learn how to create and use linked list and its applications.
3. To learn the importance of static and dynamic use of stack and queues.
4. To learn the basic terminology of trees.
5. To learn basics of sorting and searching techniques.

COURSE CONTENT:

1 Write a C program that uses functions to perform the following:

a) Create a singly linked list of integers.
b) Delete a given integer from the above linked list.
c) Display the contents of the above list after deletion.

2 Write a C program that uses functions to perform the following:

a) Create a doubly linked list of integers.
b) Delete a given integer from the above doubly linked list.
c) Display the contents of the above list after deletion.

3. Write a C program that uses stack operations to convert a given infix expression into its postfix Equivalent, Implement the stack using an array.

4 Write C programs to implement a double ended queue ADT using i) array and ii) doubly linked list respectively.

5 Write a C program that uses functions to perform the following:

a) Create a binary search tree of characters.
b) Traverse the above Binary search tree recursively in Post order.

6 Write a C program that uses functions to perform the following:

a) Create a binary search tree of integers.
b) Traverse the above Binary search tree non recursively in in order.

7 Write C programs for implementing the following sorting methods to arrange a list of integers in ascending order:

- Insertion sort

b) Merge sort
c) Quick sort
d) Selection sort

COURSE OUTCOMES (COS):

Upon successful completion of the course as a student will be able to

CO	Detailed Statement of the CO
CO1	Able to understand basics of C programming language and arrays.
CO2	Able to understand basic concepts of linked list.
CO3	To understand the basic concepts of stack and queues through array and linked list.
CO4	To understand the basic knowledge of trees and graph.
CO5	Able to understand the concepts of sorting and searching techniques.

PO CO MAPPING

CO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO1 1	PO 12
CO1	3	2			2	1	1					
CO2		3	2	1	2	1						
CO3	1	1	3		1		1					
CO4		2	2	3	2		1					
CO5	1		2	1	1	1						