Credit Framework for the Bachelor of Computer Applications -NEP-2020
School of Computer Applications, BBD University, Lucknow

SEMESTER	Discipline Specific Core (DSC) (Major)	Discipline Specific Elective (DSE) (Major)	Generic Elective (GE) (Minor)	Co-Curricular (CC)	Vocational Course(VOC)	Survey/ Seminar/MOOC/Community Outreach (SSMC)	GP	Total Credit
1	3 Subjects 16 Credits (6+6+4 Credits)		1 Subject 4 Credits	1 Subject 3 Credits	1 Subject 2 Credits		1 Credit	26
2	3 Subjects 16 Credits (6+6+4 Credits)		1 Subject 4 Credits	1 Subject 3 Credits	1 Subject 2 Credits		1 Credit	26
Early Exit Option-1: Award of CERTIFICATE (After 1 Year: 52 Credits)								
3	4 Subjects 19 Credits (6+6+4+3 Credits)		1 Subject 4 Credits		1 Subject 2 Credits		1 Credit	26
4	3 Subjects 15 Credits (6+6+3 Credits)	1 Subjects 4 Credits	1 Subject 4 Credits		1 Subject 2 Credits		1 Credit	26
Early Exit Option-2: Award of DIPLOMA (After 2 Year: 104 Credits)								
5	3 Subjects 16 Credits (6+6+4 Credits)	2 Subjects 8 Credits (4+4 Credits)					1 Credit	25
6	1 Subject 4 Credit (Online Mode) Industrial Training Cum-Project 20 Credits						1 Credit	25
Early Exit Option-3: Award of Bachelor of Computer Applications (After 3 Year: 154 Credits)								
7	2 Subjects 12 Credits (6+6 Credits) Desertation-I 8 Credits	1 Subject 4 Credits					1 Credit	25
8	2 Subjects 10 Credits (6+4 Credits) Desertation-II 14 Credits						1 Credit	25
Award of Bachelor of Computer Applications With Research (After 4 Years: 204 Credits)								

Babu Banarasi Das University, Lucknow
School of Computer Applications
Bachelor of Computer Applications
Evaluation Scheme (w. e. f. Academic Session 2023-24)

SEMESTER I

Course Category	Course Code	Course Title	Period Per Week			Evaluation Scheme			Credits
			L	T	P	CIA	ESE	Total	
DSC	BCAN11101	Computer Fundamentals	3	1	0	40	60	100	4
DSC	BCAN11102	Web Designing	3	1	0	40	60	100	4
DSC	BCAN11103	Digital Electronics & Computer Organization	3	1	0	40	60	100	4
GE		Generic Elective-I	3	1	0	40	60	100	4
CC		Co-Curricular-I	2	1	0	40	60	100	3
DSC	BCAN11151	Computer Application Lab	0	0	4	40	60	100	2
DSC	BCAN11152	Web Designing Lab	0	0	4	40	60	100	2
VC		Vocational Course-I	2	0	0	40	60	100	2
	GPN1101	General Proficiency	0	0	0	100	0	100	1
Total			**16**	**5**	**8**	**420**	**480**	**900**	**26**

SEMESTER II

Course Category	Course Code	Course Title	Period Per Week			Evaluation Scheme			Credits
			L	T	P	CIA	ESE	Total	
DSC	BCAN12101	Programming in C	3	1	0	40	60	100	4
DSC	BCAN12102	Operating System	3	1	0	40	60	100	4
DSC	BCAN12103	Database Management System	3	1	0	40	60	100	4
GE		Generic Elective-II	3	1	0	40	60	100	4
CC		Co-Curricular-II	3	0	0	40	60	100	3
DSC	BCAN12151	Programming in C Lab	0	0	4	40	60	100	2
DSC	BCAN12152	Database Management System Lab	0	0	4	40	60	100	2
VC		Vocational Course-II	2	0	0	40	60	100	2
	GPN1201	General Proficiency	0	0	0	100	0	100	1
Total			**17**	**4**	**8**	**420**	**480**	**900**	**26**

Early Exit Option-1: Award of CERTIFICATE (After 1 Year: 52 Credits)

SEMESTER III

Course Category	Course Code	Course Title	Period Per Week			Evaluation Scheme			Credits
			L	T	P	CIA	ESE	Total	
DSC	BCAN13201	Object Oriented Programming Using Java	3	1	0	40	60	100	4
DSC	BCAN13202	Data Structure Using C	3	1	0	40	60	100	4
DSC	BCAN13203	Data Communication and Network	3	1	0	40	60	100	4
DSC	BCAN13204	Numerical & Statistical Mathods	3	0	0	40	60	100	3
GE		Generic Elective-III	3	1	0	40	60	100	4
DSC	BCAN13251	Object Oriented Programming Using Java Lab	0	0	4	40	60	100	2
DSC	BCAN13252	Data Structure Using C Lab	0	0	4	40	60	100	2
VC		Vocational Course-III / SSMC	2	0	0	40	60	100	2
	GPN1301	General Proficiency	0	0	0	100	0	100	1
Total			**17**	**4**	**8**	**420**	**480**	**900**	**26**

SEMESTER IV

Course Category	Course Code	Course Title	Period Per Week			Evaluation Scheme			Credits
			L	T	P	CIA	ESE	Total	
DSC	BCAN14201	Python Programming	3	1	0	40	60	100	4
DSC	BCAN14202	.Net Framework & C#	3	1	0	40	60	100	4
DSC	BCAN14203	Design Analyis and Algorithm	3	0	0	40	60	100	3
GE		Generic Elective-IV	3	1	0	40	60	100	4
DSE		Discipline Specific Elective-I	3	1	0	40	60	100	4
DSC	BCAN14251	Python Programming Lab	0	0	4	40	60	100	2
DSC	BCAN14252	.Net Framework & C# Lab	0	0	4	40	60	100	2
VC		Vocational Course-IV / SSMC	2	0	0	40	60	100	2
	GPN1401	General Proficiency	0	0	0	100	0	100	1
Total			**17**	**4**	**8**	**420**	**480**	**900**	**26**

Early Exit Option-2: Award of DIPLOMA (After 2 Year: 104 Credits)

SEMESTER V

Course Category	Course Code	Course Title	Period Per Week			Evaluation Scheme			Credits
			L	T	P	CIA	ESE	Total	
DSC	BCAN15301	Mobile Application Development	3	1	0	40	60	100	4
DSC	BCAN15302	Server Side Programming Using PHP	3	1	0	40	60	100	4
DSC	BCAN15303	Software Engineering	3	1	0	40	60	100	4
DSE		Discipline Specific Elective-II	3	1	0	40	60	100	4
DSE		Discipline Specific Elective-III	3	1	0	40	60	100	4
DSC	BCAN15351	Mobile Application Development Lab	0	0	4	40	60	100	2
DSC	BCAN15352	Server Side Programming Using PHP Lab	0	0	4	40	60	100	2
	GPN1501	General Proficiency	0	0	0	40	60	100	1
Total			**15**	**5**	**8**	**320**	**480**	**800**	**25**

SEMESTER VI

Course Category	Course Code	Course Title	Period Per Week			Evaluation Scheme			Credits
			L	T	P	CIA	ESE	Total	
Theory									
DSC	BCAN16301	Advance Computer Technologies (Online)	3	1	0	40	60	100	4
DSC	BCAN16351	Industrial Training Cum-Project	0	0	0	200	400	600	20
	GPN1601	General Proficiency	0	0	0	100	0	100	1
Total			**3**	**1**	**0**	**340**	**460**	**800**	**25**

Early Exit Option-3: Award of Bachelor of Computer Applications (After 3 Year: 154 Credits)

SEMESTER VII

Course Category	Course Code	Course Title	Period Per Week			Evaluation Scheme			Credits
			L	T	P	CIA	ESE	Total	
DSC	BCAN17401	Statistical & Optimization Techniques	3	1	0	40	60	100	4
DSC	BCAN17402	Research Methodology	3	1	0	40	60	100	4
DSE		Discipline Specific Elective-IV	3	1	0	40	60	100	4
DSE		Discipline Specific Elective-V	3	1	0	40	60	100	4
DSC	BCAN17451	Statistical Package for Social Sciences(SPSS) Lab	0	0	4	40	60	100	2
DSC	BCAN17452	Minor Dissertation	0	0	12	100	200	300	6
	GPN1701	General Proficiency	0	0	0	100	0	100	1
Total			**12**	**4**	**16**	**400**	**500**	**900**	**25**

SEMESTER VIII									
Course Category	**Course Code**	**Course Title**	**Period Per Week**			**Evaluation Scheme**			**Credits**
			L	**T**	**P**	**CIA**	**ESE**	**Total**	
DSC	BCAN18401	R Programming	3	1	0	40	60	100	4
DSC	BCAN18402	Intellectual Property Rights	3	1	0	40	60	100	4
DSC	BCAN18451	R Programming Lab	0	0	4	40	60	100	2
DSC	BCAN18452	Major Dissertation	0	0	28	200	300	500	14
	GPN1801	General Proficiency	0	0	0	100	0	100	1
Total			**6**	**2**	**32**	**420**	**480**	**900**	**25**
Award of Bachelor of Computer Applications With Research (After 4 Years: 204 Credits)									

DSC	Discipline Specific Core
DSE	Discipline Specific Elective
GE	Generic Elective
CC	Co-Curricular
VC	Vocational Course
GP	General Proficiency
L	Lecture
T	Tutorial
P	Practical

Generic Elective-I		
1	BCAN11111	Office Automation
2	BCAN11112	Introduction to Multimedia
Generic Elective-II		
1	BCAN12111	Desktop Publishing (DTP)
2	BCAN12112	Animation & Design
Generic Elective-III		
1	BCAN13211	Artificial Intelligence
2	BCAN13212	Cloud Computing
Generic Elective-IV		
1	BCAN14211	Data Mining
2	BCAN14212	Internet of Things

Discipline Specific Elective-I		
1	BCAN14221	E-Commerce
2	BCAN14222	E-Goverance
3	BCAN14223	Enterprise Resource Planning (ERP)
Discipline Specific Elective-II		
1	BCAN15321	Biometric Security
2	BCAN15322	Blockchain Technology
3	BCAN15323	Storage Area Network
Discipline Specific Elective-III		
1	BCAN15324	Machine Learning
2	BCAN15325	Neural Network
3	BCAN15326	Data Analytics
Discipline Specific Elective-IV		
1	BCAN17421	Fundamentals of Data Privacy
2	BCAN17422	Soft Computing
3	BCAN17423	Deep Learning
Discipline Specific Elective-V		
1	BCAN17424	Computer Vision
2	BCAN17425	Natural Language Processing
3	BCAN17426	Human Computer Interaction

Note: 1. Student may select any subject from Co-Curricular list offered by the University

2. Student may selct any subject from Vocational Course list offered by the University

Bachelor of Computer Applications

FIRST SEMESTER

Program	Bachelor of Computer Applications				
Year	I	**Semester**	I		
Course Name	Computer Fundamentals				
Code	BCAN11101				
Course Type	DSC	**L**	**T**	**P**	**Credit**
Pre-Requisite		3	1	0	4
Course Objectives	The Subject provides the fundamental concepts of Computer, its functional and hardware components, Computer Networks, Operating System, and Modern Technologies.				
Course Outcomes					
CO1	To Understand the Functional Components of Computers, History of Computers, Hardware, and Software Components of Computer.				
CO2	To Understand the Concept of Operating Systems, Computer Security Systems, Computer Viruses.				
CO3	Understand the Concept of Computer Networking and How to Use Internet Technology and Their Various Applications.				
CO4	Understanding about the Modern Technologies.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Introduction to Computers:** Introduction to Computer; Basics of Computers and its Operation; History of Computer; Generations of Computer; Capabilities and limitations of Computers; Types of Computers; Hardware: CPU (Architecture & Related Technology) and introduction to Microprocessors; Storage Devices: Primary & Secondary; Auxiliary Storage Devices; Cache Memory; Memory Hierarchy; Buffering and Spooling; Types of Software: System Software, Application Software; Input Devices; Output Devices; Booting and POST.	15	CO1
2	**Operating System:** Types of Operating System; MS-DOS: Internal and External Commands; MS-Windows; Functions of Operating System: Process Management (Job Scheduling), Memory Management, File Management, I/O Management, Security; Introduction to Programming Languages, Language Processing: Translator, Assembler, Compiler, Interpreter, Cross Compiler; Security threats: Virus & Anti-Virus and worms.	15	CO2
3	**Computer Networks & Internet:** Data Communication: Signaling & Transmission; Network Devices: HUB, Switch, Router, Gateways, etc.; Types of Networks: LAN, MAN, WAN, PAN; Topology: Types of Topologies; Transmission Mode & Media; Switching Techniques; Internet and Protocol, Internet Services, OSI Reference Model; TCP/IP Reference Model.	15	CO3
4	**Introduction to Modern Technologies:** Open Source Software: benefits, comparison between OSS and license software; Mobile Application Development: android , emulator; Data Science & Analysis: need of Data Science, components; Artificial Intelligence: application, types, goals; Soft Computing: need, elements, difference between hard and soft computing; Cloud Computing: types, advantages and disadvantages, applications; IOT: features, advantages and disadvantages; Digital Marketing: components; Blockchain:	15	CO4

	areas of blockchain, concept of bitcoin; Edge Computing: applications, challenges; Extended Reality (XR): applications, AR, VR, MR.		

Suggested Readings

1. E. Balagurusamy, "Fundamentals of Computers", Tata McGraw Hill Education, 2nd Edition, 2010.
2. Peter Norton's., "Introduction to Computers", McGraw Hill Education, 7th Edition, 2017.
3. Raja Raman,V. "Fundamentals of Computers", PHI Publications, 6th Edition, 2014.
4. A. K. Sharma, "Computer Fundamentals & Programming in C". The Orient Blackswan; Second Edition, 2018.

Online Resources

1. https://nptel.ac.in/courses/106106092
2. http://www.iitk.ac.in/esc101/current/lectures.html

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2				2	1	2		1		1	2	1	
CO2	2				3	2	2		1		1	2	2	
CO3	3	1			2	2	2		1	1	1	2	2	
CO4	2	1			2	2	2		1	1	1	2	2	

Program	Bachelor of Computer Applications				
Year	I	**Semester**	I		
Course Name	Web Designing				
Code	BCAN11102				
Course Type	DSC	**L**	**T**	**P**	**Credit**
Pre-Requisite		3	1	0	4
Course Objectives	To focus on the process of Web Designing and build sound concepts of different languages like HTML, CSS, and JavaScript and tools used in Web Designing. Also, to create a static and dynamic, interactive web pages quickly, confidently, and successfully. This course gives you the basic knowledge of Dreamweaver and its applications.				
Course Outcomes					
CO1	Understand the basic concept of HTML and application in web designing.				
CO2	Students develop static and dynamic website using HTML and CSS.				
CO3	Understanding the basic concept of Java Script and its application.				
CO4	Student able to develop personal and professional websites.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Basics of Web Designing:** Introduction to Web (www), Uniform Resource Locator (URL), Hypertext Transfer Protocol (HTTP), Introduction to Internet, Web Browsers, Web Clients, Web Servers , Introduction to HTML: HTML tags and its attributes; Text Formatting tags; Various types of Lists: Ordered, Unordered, Definition lists ;Table tags: Methods to Create Tables, Attributes of table tag, Col span and Row span; Frame tags and its Attributes; Form tag: Creation of Forms, Textbox, Radio Button, Hidden etc; Image, Anchor Tag ; Links to External Documents: Inter-page and Intra-page linking.	15	CO1
2	**DHTML and CSS:** Introduction to DHTML: Uses of DHTML, Features of DHTML, Components of Dynamic HTML, Advantages and disadvantage of DHTML; CSS (Cascading Style Sheet): Font Attributes, Color and Background Attributes Text Attributes, Border, Margin related Attributes, List Attributes; Types of Style Sheet-Inline, External and Embedded; CSSP (Cascading Style Sheet Positioning); Document Object Model; JSSS (JavaScript assisted Style Sheet); Browser objects; DHTML Events.	15	CO2
3	**JavaScript:** Introduction to JavaScript: Basic Programming Techniques: Data Types, Creating Variables and JavaScript Array; Operators and Expressions in JavaScript: Arithmetic, Logical, Comparison, String and Conditional Operators; JavaScript Programming Constructs: Conditional checking, Loops; Functions in JavaScript: Built in Functions and User Defined Functions; Dialog Boxes: Alert, Confirm and Prompt Dialog Box.	15	CO3
4	**JavaScript Document Object Model (DOM):** Object hierarchy in DOM, Event Handling; Form Object: Form Object's Methods and Properties, Text Element, Button Element; Other Built in Objects in JavaScript, String, Math and Date Object; Writing Client-Side Validations from HTML, Regular Expression, Cookies, Page Redirect, Session Storage, Error Handling and Debugging.	15	CO4

Suggested Readings

1. Xavier, C, “Web Technology and Design”, New Age International Publications.
2. BayrossIvan,”HTML, DHTML. JavaScript, and PHP”, BPB Publications.
3. Achyut S Godbole and Atul Kahate, “Web Technologies”, Tata McGraw Hill.
4. Ramesh Bangia, “Internet and Web Design”, New Age International.
5. Steven M. Schafer, “HTML, XHTML, and CSS Bible, 5ed”, Wiley India
6. Ian Pouncey, Richard York, “Beginning CSS: Cascading Style Sheets for Web Design”, Wiley India

Online Resources

1. https://www.youtube.com/watch?v=h_RftxdJTzs
2. https://youtu.be/uUhOEj4z8Fo

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2		2		2	1	2		1			2	1	1
CO2	2		2		2	2	2		1			2	1	1
CO3	2	2	2	2	3	2	3		2	2	2	2	2	2
CO4	2	2	3	2	2	2	3		3	2	2	2	3	3

Program	Bachelor of Computer Applications				
Year	I	**Semester**	I		
Course Name	Digital Electronics & Computer Organization				
Code	BCAN11103				
Course Type	DSC	**L**	**T**	**P**	**Credit**
Pre-Requisite		3	1	0	4
Course Objectives	Develop a comprehensive understanding of Digital Electronics and Computer Organization, focusing on the design and implementation aspects. Enable students to effectively analyze and communicate design challenges in developing processors or other components that meet specific design requirements.				
Course Outcomes					
CO1	Acquire a strong foundation in the vocabulary and fundamental principles of Digital Electronics.				
CO2	Develop a solid understanding of the terminology and fundamental principles of Computer Processors.				
CO3	Gain a comprehensive understanding of the principles governing communication between Input/Output (I/O) devices and Processors.				
CO4	Demonstrate a thorough understanding of the concepts related to storing and retrieving data from memory.				

Module	**Course Contents**	**Contact Hrs.**	**Mapped CO**
1	**Introduction to Digital Electronics:** Number System, Boolean Algebra**,** Minimization of Boolean Expressions using K-Map; Logic Gates, Implementations of Logic Functions using Gates; **Combinational Circuits:** Introduction to combinational circuits, Adders & Subtractors; Multiplexer & De-Multiplexer; Decoder; **Sequential Circuit:** Introduction to Flip Flops, Types of Flip flop, Excitation table of Flip flop, Introduction of Registers; Classification of Registers, Introduction of Counter; Synchronous and Asynchronous counter.	15	CO1
2	**Register Transfer and Micro-operation:** Register Transfer Language: Bus and Memory Transfer; Micro operations: Arithmetic, Logical, shift micro- operations; Arithmetic logic shift unit; Timing and control; Instruction codes; Computer instructions, Instructions Format., Instruction Cycle; **Central Processing Unit:** Accumulator based organization; General register organization; Stack organization; Addressing Modes, RISC vs. CISC, Hard wired & micro programmed control Unit.	15	CO2
3	**I/O Organizations:** Introduction to system buses; Input/ output interface; Interrupt and Types of Interrupts, Serial Vs Parallel communications; I/O Processor; Synchronous Data Transfer; Asynchronous Data Transfer methods: Strobe Control, handshaking; Modes of Data Transfer: Programmed I/O, Interrupt initiated I/O. DMA: DMA Controller, DMA Transfer	15	CO2 & CO3
4	**Memory organizations**: Memory hierarchy; Main Memory: RAM Chips, ROM Chips; Concept of address space & Memory Space; Address Mapping; Auxiliary Memory; Cache memory: Mapping Techniques: Direct mapping, Associative mapping, Set associative mapping; Associative memory	15	CO4

Suggested Readings

1. M. Morris Mano “Digital Logic and Computer Design”, 2nd Edition, PHI.
2. P. Raja, “Switching Theory”, Fourth Edition, Umesh Publication.

3. M. Morris Mano, “Computer System Architecture”, PHI
4. William Stalling, “Computer Organization & Architecture”, Pearson Education Asia.

Online Resources

1. https://www.youtube.com/watch?v=TH9nd-KdVHs
2. https://archive.nptel.ac.in/courses/117/106/117106086/
3. https://archive.nptel.ac.in/courses/106/105/106105163/

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	2	2	3	2	2				2	1	1	2	2
CO2	2	2	2	2	2	3				3	2	1	3	2
CO3	2	2	1	1	1	1				2	2	2	2	
CO4	2	2	2	2	3	2				2	2	1	3	1

Program	Bachelor of Computer Applications				
Year	I	**Semester**	I		
Course Name	Office Automation				
Code	BCAN11111				
Course Type	GE	**L**	**T**	**P**	**Credit**
Pre-Requisite		3	1	0	4
Course Objectives	The course objective of Microsoft Office is to provide users with a comprehensive understanding of the various tools and features available in the word processing software, spreadsheet software, presentation software and database management software.				
Course Outcomes					
CO1	Understand the concepts of Word documentation.				
CO2	Understand the mathematical and functional concepts of Excel.				
CO3	Student learns presentation design skill.				
CO4	Student able to create and manage the database.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Introduction to MS Word**: 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, color 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, Drawing - Inserting Clip Arts, Pictures/Files etc., Tools – Word Completion, Spell Checks, Mail merge, Templates, creating contents for books, Creating Letter/Faxes, Creating Web pages, Using Wizards, Tracking Changes, Security, Digital Signature. Printing Documents – Shortcut keys.	15	CO1

2	**Introduction to MS Excel**: MS Excel: 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. Formatting Spreadsheets- Labelling columns & rows, Formatting- Cell, row, column & Sheet, Category - Alignment, Font, Border & Shading, Hiding/ Locking Cells, Anchoring objects, Formatting layout for Graphics, Clipart etc., Worksheet Row & Column Headers, Sheet Name, Row height & Column width, Visibility - Row, Column, Sheet, Security, Sheet Formatting & style, Sheet background, Color etc., Borders & Shading – Shortcut keys. Working with sheets – Sorting, Filtering, Validation, Consolidation, and Subtotal. Creating Charts - Drawing. Printing. Using Tools – Error checking, Spell Checks, Formula Auditing, Creating & Using Templates, Pivot Tables, Tracking Changes, Security, Customization.	15	CO2
3	**Introduction MS Power Point:** MS Power point: 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, Color, 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.	15	CO3
4	**MS Access:** 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,	15	CO4

	Printing & Print Preview – Importing data from other databases viz. MS Excel etc.		

Suggested Readings

1. McFedries, P. "Automating Microsoft Office 2019 Work with VBA", Wiley, 2019.
2. Walkenbach, J., "Excel VBA Programming for Dummies", Dummies, 2020.
3. Machado, M., "PowerShell for Office 365", Apress, 2019.

Online Resources

1. https://nios.ac.in/online-course-material/sr-secondary-courses/word-processing-(327).aspx
2. https://ncert.nic.in/textbook/pdf/kect103.pdf
3. https://nios.ac.in/media/documents/vocational/basiccomp/l12.pdf
4. https://support.microsoft.com/en-us/office/basic-tasks-for-creating-a-powerpoint-presentation-efbbc1cd-c5f1-4264-b48e-c8a7b0334e36
5. https://cag.gov.in/uploads/course_material/CourseMaterial-05ef48abca632f4-86870602.pdf

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	2	1	1	2	2	2			1	3	2	2	
CO2	2	2	2	2	2	2	2		2	2	3	2	2	2
CO3	2	2	1	1	3	2	2		2	1	3	2	2	
CO4	2	2	1	2	2	2	2				1	2	2	

Program	Bachelor of Computer Applications				
Year	I	**Semester**	I		
Course Name	Introduction to Multimedia				
Code	BCAN11112				
Course Type	GE	**L**	**T**	**P**	**Credit**
Pre-Requisite		3	1	0	4
Course Objectives	The subject focuses on the basic concepts of Multimedia, its elements and making of Multimedia Projects.				

Course Outcomes	
CO1	Understand the basic concepts of Multimedia and its applications.
CO2	Understand the elements of Multimedia applications.
CO3	Understand the making of Multimedia Project.
CO4	Understand the Multimedia Tools and Virtual Reality.

Module	**Course Contents**	**Contact Hrs.**	**Mapped CO**
1	**Introductory Concepts:** Definition of Hypertext, Hypermedia and Multimedia, Categories of Multimedia, Multimedia Highway, Content Distribution System (CD/DVD, Internet, Television, Flash Drive), Skills and Training Opportunities in Multimedia, Motivation for Multimedia Usage, Multimedia Operating System, Multimedia Communication System, Multimedia Entertainment, Multimedia Business, Multimedia in Education and Training, Smart-classroom, Multimedia Advertisement, Multimedia Web, Multimedia in Banking and Finance, Multimedia in E-Commerce & M-Commerce, Multimedia in E-Governance, Multimedia at Home, Multimedia in Public Places.	15	CO1
2	**Elements of Multimedia:** Graphics, Types of Graphic Images, Graphic Files Compression Formats, Uses for GIF and JPEG Files, Image Resolution &Color; Audio &Video: Sound and Audio, Analog Sound Vs Digital Sound, Audio File Formats, Image Capture Formats, Digital Video, Need for Video Compression, Video File Formats, Uses of MPEG, MP4, AVI and .VOB files, Multimedia Text, Multimedia Standards.	15	CO2
3	**Making a Multimedia:** The Stages of Multimedia Project, Multimedia Hardware: Input Device and Output Devices; Multimedia Software: Device Drivers, Media Players, OCR Software; Multimedia Project Team: Project Manager, Multimedia Designer, Video Specialist, Audio Specialist, Multimedia Programmer; Process of Making Multimedia Applications.	15	CO3
4	**Multimedia Tools:** Basic Tools, Types of Basic Tools, Authoring Tools, Types of Authoring Tools, Multimedia Editing Tools, Media Conversion Tools, Text Editing and Word Processing Tools, Painting and Drawing Tools; **Introduction to VRML:** Virtual Reality & Augmented Reality, Applications of virtual & Augmented Reality, Introduction to MIME and its Types.	15	CO4

Suggested Readings

1. Tay Vaughan, “Multimedia, Making IT Work”, Tata McGraw Hill, 1993.
2. Buford, “Multimedia Systems”, Addison Wesley, 1994.
3. Sleinreitz, “Multimedia System”, Addison Wesley, 1995.

4. David Hillman, “Multimedia technology and Applications”, Galgotia Publications, 1997.

Online Resources

1. https://egyankosh.ac.in/handle/123456789/10499
2. https://www.tutorialspoint.com/multimedia/multimedia_introduction.htm

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2						1			1	1	1	1	
CO2	2	2			1	1	2			2	2	2	2	
CO3	2	2	2	2	2	2	3		2	1	2	2	2	2
CO4	2	2			3	2	1			2	3	2	2	

Program	Bachelor of Computer Applications				
Year	I	**Semester**	I		
Course Name	Computer Application Lab				
Code	BCAN11151				
Course Type	DSC	**L**	**T**	**P**	**Credit**
Pre-Requisite		0	0	4	2
Course Objectives	The course objective of Microsoft Office is to provide users with a comprehensive understanding of the various tools and features available in the word processing software, spreadsheet software, presentation software and database management software.				
Course Outcomes					
CO1	Create, edit, save, and print documents. Include lists and tables in it. Format text and to use styles, add a graphic to a document, manipulate documents using functions such as find and replace; cut, copy, replace.				
CO2	Create, edit, save, and print, format presentations. Add a graphic to a presentation. Create and manipulate simple slide shows with outlines and notes. Use design layouts and templates for presentations.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	1. Microsoft Word: a. Creating and formatting a professional-looking resume. b. Designing a newsletter with multiple columns, images, and hyperlinks. c. Creating a table of contents and incorporating footnotes in a research paper. 2. Microsoft Excel: a. Creating a budget spreadsheet with formulas for calculating expenses, income, and savings. b. Analyzing sales data using charts and graphs to identify trends and patterns. c. Building a loan amortization schedule to understand repayment plans.	15	CO1
2	3. Microsoft PowerPoint: a. Designing an engaging presentation on a historical event or a scientific concept. b. Creating an interactive slideshow with hyperlinks and custom animations. c. Using advanced features like slide transitions, embedded videos, and audio narration. 4. Microsoft Access: a. Creating a database to manage inventory for a small business. b. Designing a student database system to track grades, attendance, and courses. c. Building a customer relationship management (CRM) database to store and analyze customer data.	15	CO2

Suggested Readings

1. McFedries, P. “Automating Microsoft Office 2019 Work with VBA”, Wiley, 2019.
2. Walkenbach, J., “Excel VBA Programming for Dummies”, Dummies, 2020.
3. Machado, M., “PowerShell for Office 365”, Apress, 2019.

Online Resources

1. https://nptel.ac.in/courses/106106092

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	2	2	2	2	2	2		1	1	2	2	2	1
CO2	2	2	2	2	2	2	2		1	1	2	2	1	1

Program	Bachelor of Computer Applications				
Year	I	**Semester**	I		
Course Name	Web Designing Lab				
Code	BCAN11152				
Course Type	DSC-Lab	**L**	**T**	**P**	**Credit**
Pre-Requisite		0	0	4	2
Course Objectives	To provide practical implementation on the process of Web Designing and build sound concepts of different languages and tools used in Web Designing using Dreamweaver framework.				
Course Outcomes					
CO1	Visualize and recognize the basic concept of HTML, DHTML and CSS in web designing.				
CO2	Understanding the basic concept of Java Script to create personal and/or business websites following current professional and/or industry standards.				

Module	**Course Contents**	**Contact Hrs.**	**Mapped CO**
1	1. Write an HTML program to create a webpage about the different art forms of India, with appropriate title on the title bar. Use different heading tags for the headings, and list them using ordered list. 2. Write an HTML program to create sections in the document using appropriate tags and apply different color as background to them. Use internal hyperlinks to move to different points within the page. 3. Write an HTML program to insert a picture on the webpage, giving description for the picture in a paragraph. Use properties of height, width, hspace, vspace and align, with different values. 4. Write an HTML Program, to create a profile of 2 pages, the First page containing the applicant's picture with personal details using unordered lists, and the second containing educational details using tables. Use hyperlinks to move to the next page. 5. Using Frames create an Indian Flag and insert the image of chakra in the center. 6. Create a frame like structure based on the given diagram, such that When the first link is clicked, the contents of the first frame is filled with the corresponding information and when the second link is clicked the second frame is filled. 7. Write a program in HTML to demonstrate the concept of Image map, for India map. Map for areas rectangle, Circle, and polygon.	15	CO1
2	1. Write a program using JavaScript to do the multiplication table for a number entered by the user in the textbox. 2. Create a sparse array using the values entered by the user in the five textboxes, and use Array methods such as sort(), pop(), push(), reverse() and join(). 3. Create a Math object and use methods ceil(), floor(), round() for rounding off the number, also use methods such as cos(), sin(),sqrt(). 4. Write a Program using JavaScript to print a bill for 5 items purchased by the user.	15	CO2

	5. Write a program Using Date object, to display appropriate greeting message “Good Morning” or “Good Afternoon” or “Good Night”, in an alert box with the user’s name, after receiving the same in the prompt box. 6. To demonstrate the concept of styles, write a program applying internal style for paragraph tag, and override the same by applying inline style. Also create an external CSS file applying styles for the headings. 7. Create a registration form for creating an email account, having the input type elements like checkbox, radio button, select option, text area and submit button, and validate the textboxes for verifying the password. 8. Create a web page using two image files, which switch between one another as the mouse pointer moves over the image. Use onMouseOut and onMouseOver event handlers. 9. Using filters apply opacity feature to blur the image and using Transition apply hover feature, so the image will be transparent again when the mouse pointer is placed on the image.		

Suggested Readings

1. Xavier, C,“Web Technology and Design”, New Age International Publications.
2. Bayross Ivan,” HTML, DHTML. JavaScript, and PHP”, BPB Publications.
3. Achyut S Godbole and Atul Kahate, “Web Technologies”, Tata McGraw Hill.
4. Ramesh Bangia,“Internet and Web Design”, New Age International.
5. Steven M. Schafer, “HTML, XHTML, andCSSBible,5ed”, Wiley India
6. Ian Pouncey, Richard York, “Beginning CSS: Cascading Style Sheets for Web Design”, Wiley India.

Online Resources

1. https://html-iitd.vlabs.ac.in/
2. https://www.cybrary.it/practice-lab/introduction-to-programming-using-java-script

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	1	2	1	2	2	2		1	1	1	1	2	2
CO2	2	2	3	2	2	2	2		2	2	2	2	2	2

SECOND SEMESTER

Program	Bachelor of Computer Applications				
Year	I	Semester		II	
Course Name	Programming in C				
Code	BCAN12101				
Course Type	DSC	L	T	P	Credit
Pre-Requisite		3	1	0	4
Course Objectives	To provide the fundamental knowledge about various concepts of programming and clear understanding of the basic terminology required for programming.				
Course Outcomes					
CO1	Understand the basic concepts of programming and various constructs of the C Language with proper syntax.				
CO2	Use and Implement programs on arrays and their operations.				
CO3	Understand and Develop programs on functions, pointers, structure, union, and enumeration.				
CO4	Understand the concept of file handling and various header Files.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Introduction:** Evolution of Programming Languages; Programming Approaches: Top-down Approach, Bottom-up Approach; Algorithm; Flowchart; Source Code; Object Code; Executable File. **Introduction to C:** Basic Structure of C Programming, Data Types: Primitive Data types, Derived Data types, User-Defined Data Types; **Operators:** Different Types of Operators, Precedence of Operators, Expression and Statements; **Token:** Variables, Constants, Literals, Identifiers, Keyword, Escape Sequence; **Types of Conversion:** Typecasting, Type Conversion; **Decision Control Statements:** IF, IF-ELSE, Nested IF, IF-ELSE ladder, Switch-case; **Iterative statements:** FOR loop, WHILE loop, DO-WHILE loop; **Jump Statements:** Break, Continue, goto.	15	CO1
2	**Array:** Declaration and Initialization of Array, Types of Arrays: Single Dimension Array, Two-Dimensional Array; Address Calculation of an Element in Array; Insertion and Deletion in an Array; **Searching**: Linear Search, Binary Search. **Sorting**: Bubble Sort, Selection Sort, Insertion Sort; **Character Array and Strings:** Reading, writing, String Handling Functions: strcat(), strcmp(), strcpy(), strlen().	15	CO2
3	**Functions:** User-Defined Functions; Function Declaration; Types of Arguments: Actual Arguments, Formal Arguments; Function Definition; Methods to Call a Function: Call by Value, Call by Reference; Passing Arrays as Parameters; Storage Classes. **Pointers:** Declaration of Pointer Variables; Pointer Arithmetic; Pointers and Arrays, Pointer and Character Strings, Array of Pointers, Pointers as Function Arguments; Structures; Unions; Array of Structures; Array of Union; Pointers and Structures; Enumerations.	15	CO3
4	**File Handling:** Opening a File, closing a File, File-Opening Modes, reading from and Writing to a File, Copying Content of an Existing File to another, File Handling Library Functions; Command Line Arguments; Pre-processor Directives. **Header Files:** stdio.h, conio.h, math.h, stdlib.h, setjmp.h, signal.h, time.h, stdarg.h, graphics.h.	15	CO4

Suggested Readings

1. E. Balagurusamy, “Programming in ANSI C”, TMH Publications.
2. Reema Thareja, “Programming in C”, OXFORD University Press.
3. Peter Norton’s, “Introduction to Computers”, TMH Publications.
4. Kernighan, Ritchie, “The C Programming Language”, PHI Publications.
5. Yashwant Kanitakar, “Let us C”, BPB Publications.

Online Resources

1. https://www.youtube.com/playlist?list=PLJ5C_6qdAvBFzL9su5J-FX8x80BMhkPy1
2. https://www.coursera.org/specializations/c-programming

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	1			1		1					2	1	1
CO2	2	2	1	1	1	1	1		1	1		2	1	1
CO3	2	2	2	1	1	2	1		1	2	1	3	3	2
CO4	2	2	2	2	1	2	1		1	1	1	1	2	2

Program	Bachelor of Computer Applications				
Year	I	**Semester**	II		
Course Name	Operating System				
Code	BCAN12102				
Course Type	DSC	**L**	**T**	**P**	**Credit**
Pre-Requisite		3	1	0	4
Course Objectives	To provide a good understanding of the underlying concepts of operating systems.				
Course Outcomes					
CO1	Understand the principles and techniques used to implement processes and threads as well as the different algorithms for process scheduling.				
CO2	Understand the mechanisms used for process synchronization & handling deadlock.				
CO3	Understand the concept of memory management and virtual memory.				
CO4	Understand the file system structure and storage management.				

Module	**Course Contents**	**Contact Hrs.**	**Mapped CO**
1	**Introduction and Process Management:** Operating System: System Components, System Calls and its types, System Programs; Types of Operating System; Operating System Structure: Simple Structure, Layered Approach, Microkernels, Exokernels; Virtual machine; Introduction to Process: Process States, Process Control Block; Process Scheduling: Scheduling Queues, Schedulers, Context Switch, Scheduling Objectives, Scheduling Criteria; Scheduling Algorithms: First Come First Serve, Shortest Job First, Round Robin, Priority; Multiple-Processor Scheduling; Real-Time Scheduling; Multilevel Feedback Queue Scheduling; Threads.	15	CO1
2	**Process Synchronization and Deadlocks**: Critical- Section Problem; Peterson's Solution; Semaphore: Usage of Semaphore; Classical Problems of Synchronization: Producer Consumer, Readers-Writer, Dining Philosophers; Deadlock System Model; Deadlock Characterization: Necessary Condition, Resource- Allocation graph; Deadlock Handling Methods: Deadlock Prevention, Deadlock Avoidance Mechanisms: Resource Allocation graph Algorithm, Banker's Algorithm, Deadlock Detection and Recovery.	15	CO1 & CO2
3	**Memory Management**: Memory Management Strategies: Address Binding, Logical and Physical Address Space, Dynamic Linking; Swapping; Contiguous and Non- Contiguous Memory Allocation; Paging; Segmentation; Virtual Memory Management Concept; Demand Paging; Page Replacement Policies: Basic Page Replacement, FIFO Page Replacement, LRU Page Replacement, Optimal Page Replacement, Counting Based Page Replacement; Allocation of Frames: Minimum Number of Frames, Allocation Algorithm, Global Versus Local Allocation; Thrashing: Cause of Thrashing, Working Set Model.	15	CO2 & CO4
4	**Storage Management:** File Concept: File Attribute, File Operations, File Types**,** File Structure; File Access Method: Sequential Method, Direct Access Method; Directory	15	CO3 & CO4

	Structure; File System Implementation: File System Structure, Allocation Methods**,** Free space Management; Secondary Storage Structure: Disk Structure**,** Disk Scheduling Algorithms**,** Disk Management.		

Suggested Readings

1. Abraham Silberschatz and Peter Baer Galvin, “Operating System Concepts”, Addison-Wesley.
2. Andrew S. Tanenbaum, “Modern Operating Systems”, Prentice Hall.
3. Milan Milankovic, “Operating Systems, Concepts and Design”, TMH.
4. William Stallings, “Operating Systems: Internal and Design Principles”, PHI.
5. D M Dhamdhere, “Operating System- a Concept based Approach”, McGraw Hill Education.

Online Resources

1. https://archive.nptel.ac.in/courses/106/105/106105214/
2. https://onlinecourses.nptel.ac.in

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3					2	2			1	1	3	2	
CO2	3	3		3	2	2	3			2	1	3	2	
CO3	2	2		2		1				2	2	3	2	
CO4	2	1		2	1	2	1			1	1	2	2	

Program	Bachelor of Computer Applications				
Year	I	**Semester**	II		
Course Name	Database Management System				
Code	BCAN12103				
Course Type	DSC	**L**	**T**	**P**	**Credit**
Pre-Requisite		3	1	0	4
Course Objectives	The objective of this course is to introduce the fundamental concepts of DBMS, terminologies of database management system, E-R Modelling, PL/SQL concept, database transactions and concurrency control techniques.				
Course Outcomes					
CO1	Understand the basic concepts of the database and data models.				
CO2	Understand the fundamental concepts ER diagrams and map ER diagrams into Relations.				
CO3	Evaluate the alternative database designs to determine which one is better according to selected criteria.				
CO4	Understand the basic concepts/features of database transactions and concurrency control techniques.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Introduction:** Data and information, Concepts of persistent data, File and File management system , Basic File Operations, File Structure and Organization, Types of File Organization: Sequential file organization, Heap file organization, Hash file organization, B+ file organization, Indexed sequential access method (ISAM),Cluster file organization; **Database Management System**: Introduction of DBMS, Evolution of DB & DBMS , Characteristics of the Database Approach, Components of Database System, Database Management System vs. File Management System, Advantages and Disadvantages of DBMS, DBMS Users , DBMS Architecture:1-Tier Architecture,2-Tier Architecture and 3-Tier Architecture. Capabilities of good DBMS, Database Schemas and Instances, Classification of Database Management Systems, Database Languages. **Introduction of Data Models**: Network Data Model, Hierarchical Data Model, Relational Data Model, Entity Relationship Data Model, Object Based Data Model, Semi-Structure Data Model.	15	CO1
2	**Relational Database Management System & Data Modelling**: Introduction to Relational database, Structure of Relational Database, Relational Data Model, Relational model terminology: Relations , Domains, Attributes, Tuples, Relational Constraints, Codd Rule, Entity- Relationship Model: Entity Sets, Entity Types, Attributes, Attributes Types, Relationships, Relationship Types, Keys, Constraints, Entity-Relationship Model: E-R Model Concepts, Notation for E-R Diagram, Mapping Constraints, Extended E-R Features, Reduction of E-R Diagram to Relation; **Relational Algebra:** Concepts of Relational Algebra, Fundamentals Operations:	15	CO1 & CO2

	Select, Project, Rename, Union, Set difference, division, Cartesian Product, Additional Relational-Algebra Operations: Set Intersection, Natural Join And Outer join.		
3	**SQL and Database Design Theory**: Introduction on SQL: Characteristics of SQL, Advantage of SQL, SQL Data Type and Literals, Types of SQL Commands, SQL Operators and their Procedure, Queries and Sub Queries, Aggregate Functions, Insert, Update and Delete Operations, Joins, Unions, Intersection, Minus, View, Basic concept of Cursors and Triggers. **Functional Dependencies and Normalization:** Informal Design Guidelines for Relation Schemas, Database Anomalies, Functional Dependencies, Armstrong's axioms, Closure of Attribute sets, Normalization: Need of Normalization, Normal Forms, First Normal Form, Second Normal Form, Third Normal Forms and Boyce-Codd Normal Forms.	15	CO3
4	**Transaction Processing & Concurrency Control:** Introduction to Transaction ACID Properties, Transaction State. Transaction logs, Importance of Backups. Database recovery. Causes of failures. Recovery concepts and terminology; **Concurrency Control:** Definition of concurrency, lost update, dirty read, and incorrect summary problems due to concurrency.	15	CO3 & CO4

Suggested Readings

1. Korth, Silbertz, Sudarshan, Database Concepts, McGraw Hill, Seventh Edition-2019
2. Elmasri, Navathe, Fundamentals of Database Systems, Addison Wesley, Seventh Edition-2017
3. Date C J, An Introduction to Database Systems, Addison Wesley, Eight Edition-2017
4. Bipin C. Desai, An Introduction to Database Systems, Galgotia Publications, Sixth Edition-2013
5. Ramkrishnan, Gehrke, Database Management System, McGraw Hill, Third Edition-2002
6. Ivan Bayross -- SQL, PL/SQL: The Programming Language of Oracle, BPP Publication, Fourth Edition-2010
7. R. S. Deshpandey --SQL/PL SQL for Oracle,2011

Online Resources

1. https://archive.nptel.ac.in/courses/106/105/106105175/
2. https://nptel.ac.in/courses/106104135

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2					1			1		1	2	2	1
CO2	1	2	3	1	3	2	1		3	2	2	2	2	2
CO3	1	1	2	3	2	2	2		3	2	2	2	2	3
CO4	2	2	1	2		2	1		1	1		2	1	2

Program	Bachelor of Computer Applications				
Year	I	**Semester**	II		
Course Name	Desktop Publishing (DTP)				
Code	BCAN12111				
Course Type	GE	**L**	**T**	**P**	**Credit**
Pre-Requisite		3	1	0	4
Course Objectives	To impart basic level knowledge of DTP software such as InDesign, Photoshop, and CorelDraw				
Course Outcomes					
CO1	Students can create Documents and Templates; add text into documents using InDesign. They can create multipage Layout Design.				
CO2	Students shall be able to use Photoshop as a premier graphic design and image editing tool, and gain entry level position in graphic design and animation.				
CO3	Students can conceptualize and create Logos, Pamphlets, posters, banners etc. using CorelDraw.				
CO4	Understand various software used for Desktop Publishing and would be able to create and design documents with text and graphics like newspaper ad, wedding cards, visiting cards, greeting card etc.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Introduction to Desktop Publishing:** Introduction to DTP, Merits & Demerits of Desktop Publishing, Design Principles of Desktop Publishing, Comparative Analysis between DTP and Traditional Composing Process, General Text Organization, Publications. **Familiarize with the Networking concept:** Practice web browsing, create email id, and sending-receiving mails with attachment. Perform text chat and video chat using social network sites. Identify different cables and connectors used in networking.	15	CO1
2	**InDesign:** Introduction to InDesign, The Application Bar, The Menu Bar, Control Panel, Tools Panel, Working with Custom Workspace, Working with Documents, Creating a Master Page, Working with Text, Working with Objects, Working with Layers, Creating Text Frames, Changing fonts and paragraph alignment Formatting the Text, Basic Formatting Tasks, Editing the Text, Working with Tables, Creating a Table, Embedding a Table within a Table, Modifying a Table, Formatting a Table.	15	CO2
3	**Photoshop:** Introduction to Photoshop, Features in Photoshop, Basic Image Manipulation, Color Basics, Painting Tools, Brush Settings, Making Selections, Filling and stroking, Layers, Advanced Layers, Text, Drawing, Using Channels and Masking , Manipulating images, Getting to know the work area, Basic Photo Corrections, Retouching and Repairing, Working with selections, Layer Basics, Masks and channels, Correcting and enhancing digital photographs, Vector drawing techniques, Advanced Layer techniques, Vector Composting, Creating Links within an image, Creating rollover web visuals, Animating GIF images for the web, Producing and printing consistent color.	15	CO3
4	**CorelDraw:** Introduction to Corel Draw, Features of Corel	15	CO4

	Draw, Corel Draw Interface, Tool Box, Common Tasks; Drawing and Coloring, Selecting Objects, Creating Basic Shapes, Reshaping Objects, Organizing objects, Applying color fills and Outlines; Mastering with Text, Text Tool Artistic and paragraph text, Formatting Text, Embedding Objects into text, Wrapping Text around Object, Linking Text to Objects; Applying Effects, Envelopes, Lens effects, Transparency, Creating Depth Effects, Power Clips; Working with Bitmap Commands, Working with Bitmaps, Editing Bitmaps, Applying effects on Bitmaps, Printing; Corel Draw- Web resources, Internet Tool bar, Setting your webpage, Exporting files,		

Suggested Readings

1. Bill Grout and Osborne, “Desktop Publishing from A to Z”, McGraw Hill,
2. Adobe creative team, “Adobe Photoshop CC Classroom in a Book “Adobe press
3. Gary David Bouton, “CorelDraw X8: The official guide”
4. M.C Sharma, “DESKTOP PUBLISHING ON PC “, BPB Publications.

Online Resources

1. http://www.nptelvideos.com/adobe/adobe_photoshop_tutorials.php
2. http://www.udemy.com/course/desktop-publishing-for-you/

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1			2		2	1	1			1	2	1		
CO2			2		2	2	2			1	2	2		2
CO3	2		3		3	2	2			2	2	2	1	2
CO4	2		3		3	3	3			2	2	2	1	2

Program	Bachelor of Computer Applications				
Year	I	**Semester**	II		
Course Name	Animation & Design				
Code	BCAN12112				
Course Type	GE	**L**	**T**	**P**	**Credit**
Pre-Requisite		3	1	0	4
Course Objectives	The subject focuses on the advanced concepts of multimedia, basic concepts of animations and its application.				
Course Outcomes					
CO1	Understand the basic concepts of internet &multimedia content delivery.				
CO2	Understand the basics of traditional and computer animation.				
CO3	Understand the elements of animation & simulating accelerations.				
CO4	Understand the process of making computer animation.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Internet and Multimedia:** Multimedia on the Web: Tools for WWW, Web Servers, Web Browsers, Search Engines, Web Page Makers and Site Builders, Plug-ins and Delivery Vehicles, Beyond HTML; **Multimedia Elements for WWW**: Developing for the Web, Text for the Web, Images for the Web, Sound for the Web, Animation for the Web, Video for the Web; **Multimedia Contents Delivery:** Testing: Alpha Testing, Beta Testing; Preparing for Delivery: file archive; Delivering on CDROM, Delivering on DVD, Wrapping it up, Delivering on World Wide Web; Video Conferencing and Virtual Reality, Electronic Encyclopedia.	15	CO1
2	**Basic of Animation:** Definition of Animation, Traditional and Historical Methods for Production of Animation, Traditional Animation Techniques, Types of Animation Systems: Key Frame Systems, Scripting System, Parameterized System, Types of Animation, Applications of Animation**; Computer Animation:** Definition of Computer Animation, Types of Computer Animation, Application of Computer Animation in Different Fields, Difference Between Traditional and Computer Animation.	15	CO2
3	**Elements of Animation:** Key frame, In-between Frame, ANIMOB, Storyboard; Computer Animation Tools: Hardware: SGI, PCs, Amiga, Macintosh; 2D Animation Software: Adobe Flash; 3D Animation Software: 3D Studio MAX; **Simulating Acceleration:** Zero Acceleration, Positive Accelerations Negative Accelerations, Combination of Positive and Negative accelerations.	15	CO3
4	**Making Computer Animation:** Sequencing of Animation Design, Required Key Frame for a Film, General Computer Animation Functions, Raster Animation, Computer Animation Languages, Key-Frame Systems, Morphing; Motion Specification: Direct Motion Specifications, Goal Directed System, Kinematics and Dynamics.	15	CO4

Suggested Readings

1. Tay Vaughan, “Multimedia, Making IT Work”, Tata McGraw Hill, 1993
2. Donald Hearn & M Pauline Baker, “Computer Graphics C Version, Prentice Hall of India, 1986.
3. Alberto Menache& John Lumsden, “Computer Animation Complete”, Morgan Kaufmann, 2009.

Online Resources

1. https://egyankosh.ac.in/bitstream/123456789/10497/1/
2. https://www.tutorialspoint.com/computer_graphics/computer_animation.htm.

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	2	2	2	2	2	2			2	2	2	2	
CO2	2	1	1	1		1	1			1	2	2	1	
CO3	2	2	1	1	3	2				2	2	2	2	2
CO4	2	2	3	3	2	3	2		2	2	2	3	3	

Program	Bachelor of Computer Applications				
Year	I	**Semester**	II		
Course Name	Programming in 'C' Lab				
Code	BCAN12151				
Course Type	DSC-Lab	**L**	**T**	**P**	**Credit**
Pre-Requisite		0	0	4	2
Course Objectives	To make the student learn a programming language, problem solving techniques and to teach the student to write programs in C and to solve the problems.				
Course Outcomes					
CO1	Understand and Implement programs with data types, operators, conditional statement, looping and arrays.				
CO2	Understand and Implement programs on functions, pointers, file, command line arguments and header files.				

Module	**Course Contents**	**Contact Hrs.**	**Mapped CO**
1	1. Implementation of Fundamental Data Types. 2. Implementation of Fundamental Operators. 3. Implementation of Conditional Program such as if, switch etc. 4. Implementation of Basic Control Constructs such as for loop, while loop, do while loop. 5. Implementation of Advance Control Constructs such as Arrays	15	CO1
2	1. Implementation of Structures, Union, and enumeration etc. 2. Implementation of Functions. 3. Implementation of Pointers. 4. Implementation of Pointers as Function Arguments. 5. Implementation of File. 6. Implementation of Command Line arguments. 7. Implementation of various header files.	15	CO2

Suggested Readings

1. E. Balagurusamy, "Programming in ANSI C", TMH Publications.
2. Reema Thareja, "Programming in C", OXFORD University Press.
3. Peter Norton's, "Introduction to Computers", TMH Publications
4. Kernighan, Ritchie, "The C Programming Language", PHI Publications
5. Yashwant Kanitakar, "Let us C", BPB Publications

Online Resources

1. https://www.youtube.com/playlist?list=PLJ5C_6qdAvBFzL9su5J-FX8x80BMhkPy1
2. https://cse02-iiith.vlabs.ac.in/

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	2			1	1	1		1	1	1	2	2	2
CO2	2	2	2	1	1	2	2		2	3	2	2	3	3

Program	Bachelor of Computer Applications				
Year	I	**Semester**	II		
Course Name	Database Management System Lab				
Code	BCAN12152				
Course Type	DSC-Lab	**L**	**T**	**P**	**Credit**
Pre-Requisite		0	0	4	2
Course Objectives	The main objective is students gain knowledge about databases for storing the data and to share the data among different kinds of users for their business operations				
Course Outcomes					
CO1	Develop database modelling for a problem.				
CO2	Design a database using normalization.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	1. Creating and Managing Tables a. Creating and Managing Tables b. Including Constraints 2.Manipulating Data a. Using INSERT statement. b. Using DELETE statement. c. Using UPDATE statement. 3. SQL Statements – 1 a. Writing Basic SQL SELECT Statements b. Restricting and Sorting Data c. Single-Row Functions 4. SQL Statements – 2 a. Displaying Data from Multiple Tables b. Aggregating Data Using Group Functions c. Subqueries	15	CO1 & CO2
2	1.Using SET operators, Date/Time Functions, GROUP BY clause (advanced features) and advanced subqueries a. Using SET Operators b. Datetime Functions c. Enhancements to the GROUP BY Clause d. Advanced Subqueries 2. Creating and Managing other database objects a. Creating Views b. Other Database Objects c. Controlling User Access 3. Using DCL commands a. creating users b. Authenticating users c. Roll back command	15	CO1 & CO2

Suggested Readings

1. Korth, Silbertz, Sudarshan, “Database Concepts”, McGraw Hill,Seventh Edition-2019
2. Elmasri, Navathe, “Fundamentals of Database Systems”, Addison Wesley,Seventh Edition-2017
3. Date C J, “An Introduction to Database Systems”, Addison Wesley,Eight Edition-2017
4. Ivan Bayross, “SQL, PL/SQL: The Programming Language of Oracle”, BPP Publication,Fourth Edition-2010
5. R. S. Desphpandey,” SQL/PL SQL for Oracle” ,2011

Online Resources

1. https://archive.nptel.ac.in/courses/106/105/106105175/
2. https://nptel.ac.in/courses/106104135
3. https://www.youtube.com/watch?v=TB5T2O8Hwm8.

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2			1	2	1	1		2		1	1	1	
CO2	1	1	1	1	2	2	2		2		1	2	1	1