

Detailed Syllabus
Lecture-wise Breakup

Course Code	23B61CA111	Semester Odd	Semester I Session 2024-25
NBA Code	CBAC101	(specify Odd/Even)	Month from July to Dec. 2024
Course Name	Fundamentals of Programming		
Credits	3-1-0	Contact Hours	4

Faculty (Names)	Coordinator(s)	Dr. Shobhit Tyagi
	Teacher(s) (Alphabetically)	Dr. Shobhit Tyagi, Mr. Akshit Raj Patel

COURSE OUTCOMES		COGNITIVE LEVELS
CO1	Introduce algorithmic thinking with pseudo code and flowchart to solve Problem.	Understanding Level (C2)
CO2	Describe various data types, memory allocation schemes, arithmetic and logical operation precedence, and the need for arrays and structures.	Understanding Level (C2)
CO3	Apply critical thinking skills to choose the appropriate data types, i.e., Array, Structures, and Union for a given problem.	Applying Level (C3)
CO4	Implement functions with and without pointers for different problems.	Applying Level (C3)
CO5	Compare the solutions using various searching (Linear, Binary) and sorting (Bubble, Selection, and Insertion) algorithms.	Analyzing Level (C4)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Algorithmic Thinking	Introduction to Algorithmic Thinking and Problem Solving, Step by step solution to simple problems, developing logic/flow- chart/pseudo code to solve problems like simple/logical games, puzzles.	8
2.	C Programming	Introduction to C Programming syntax and semantics, data types and variables, expressions and assignments, array, simple I/O, conditional and iterative control structures, functions and parameter passing, e.g., factorial, Fibonacci, Programs for pattern generation.	12
3.	Programs for Elementary numerical problems	Unit conversion, Average, Sum, Min, Max of a list of numbers, Common operations with Matrix, polynomial, and polygons, Approximating the square root of a number, Finding the greatest common divisor	6
4.	Advanced C programming	Structure, Union, pointers, Pointer arithmetic, Handling 1 D and 2 D array using its pointer notation, sending these in function.	10
5.	Searching and Sorting Techniques	Linear and binary search, Insertion, Selection, and Bubble sort.	6
Total number of Lectures			42

Evaluation Criteria	
Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Attendance-5, Quiz-5, Assignment-10 and Mini Project/Case Study-5)
Total	100

PBL: Each student in a group of 3-4 will have to develop a small Project using C Programming. The students will be applying the fundamentals of algorithmic Thinking and Searching and Sorting Techniques. It will familiarize the students with the design and implementation aspect of C Programming.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1	Deitel, Paul; Deitel, Harvey, C: How to Program (8 Edition.). Pearson. ISBN 978-0133976892, 2015.
2	Perry, Greg; Miller, Dean, C Programming: Absolute Beginner's Guide (3 ed.). Que. ISBN 978-0789751980, 2013.
3	C Programming : The Definitive Beginner's Reference, Harry H. Chaudhary, First MIT-Createspace-Inc, 2014.
4	Programming in ANSI C, E Balagurusamy, 8th Edition, Mc Graw Hill 2019,
5	Stroustrup, Bjarne, The C++ Programming Language (Fourth ed.). Addison-Wesley. ISBN 978-0-321-56384-2, 2013.
6	Nixon, Robin. Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5. " O'Reilly Media, Inc.", 2014.
7	David Griffiths, and Dawn Griffiths “Head First C 1/e Edition”, O’Reilly Publication, 2012.
8	D. S. Malik, “C++ Programming: From Problem Analysis to Program Design, 6th Edition, Course Technology, Cengage Learning, 2012
9	Peter Prinz, Tony Crawford, “C in a Nutshell, 2nd Edition, O’Reilly , 2016.
10	Mittal, Mandeep, & Porwal, Shardha, “C Programming”, Alpha Science International Limited, 2016

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO2
CO1	3	2	2	1	1		1		1
	Strongly, understand fundamental knowledge in flowchart designing	Moderately, exemplifying a problem	Moderately, summarizing the solution as a flowchart	Slightly, understand the limitations of technologies while applying them effectively to flowchart designing	Slightly, present a report on the design and development of a C program		Slightly, able to engage in life long learning		Slightly, relating flowchart designing in C program development

CO2	2	1	1			1	1		1
	Moderately, Associating the knowledge of fundamentals to develop C programs	Slightly, understand a problem to develop C programs	Slightly, extending fundamentals of the C programs			Slightly understanding the management principles	Slightly, able to engage in life long learning		Slightly, exemplifying programming skills in C programs development
CO3	3	1	1	2			1		1
	Strongly Applying Critical thinking to develop C programs	Slightly, interviewing a problem for development of C program	Slightly, develop C programs using array, structure and union	Moderately, examine the limitations of technologies while applying them effectively to develop C programs			Slightly, able to engage in life long learning		Slightly, integrating array, structure and union designing in C program development
CO4	3	2	1	1			1		1
	Strongly, Applying function and pointers to develop C programs	Moderately, interviewing a program into the small components	Slightly, develop C programs using functions and pointers	Slightly, examine the limitations of technologies while applying them effectively to develop C programs			Slightly, able to engage in life long learning		Slightly, integrating function and pointers designing in C program development
CO5	2	1	1				1		1
	Moderately, Analyze the searching sorting techniques in C program development	Slightly, Structuring the role of searching and sorting techniques to develop C program	Slightly, develop C programs using searching and sorting techniques				Slightly, able to engage in life long learning		Slightly, Linking searching sorting techniques in C program development

Detailed Syllabus

Lecture-wise

Breakup

Course Code NBA Code	23B61CA112 CBAC102	Semester ODD (specify Odd/Even)	Semester I	Session 2024 -2025 Month from July 2024 to Dec 2024
Course Name	Web Technology			
Credits	2	Contact Hours	2-0-0	

Faculty (Names)	Coordinator(s)	Dr. Shweta Rani
	Teacher(s) (Alphabetically)	Dr. Shweta Rani

COURSE OUTCOMES		COGNITIVE LEVELS
CBAC102.1	(Understand Internet, Web and its basic concept	Understand (Level 2)
CBAC102.2	Apply web languages and its components to build basic web page	Apply (Level 3)
CBAC102.3	Develop static web pages using HTML, JavaScript and CSS	Apply (Level 3)
CBAC102.4	Develop dynamic web page using PHP	Apply (Level 3)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction to the Internet and Web Technology	Understanding the Internet and its evolution, Overview of web browsers and web servers Distinction between static and dynamic web pages, Introduction to client-side and server-side scripting and Overview of web programming languages, web protocols and web application framework	6
2.	Creating HTML Pages	Understanding the structure of HTML documents, HTML tags and elements, headings, paragraphs, lists, and links, Inserting images and multimedia content, Form handling and basic input elements Creating.	8
3.	Styling the Web Pages with CSS	Introduction to Cascading Style Sheets (CSS), CSS selectors and properties, Formatting text and backgrounds, Applying layouts and positioning elements, Creating responsive designs for various devices	4
4.	Dynamic and Interactive Web Pages with JavaScript	Introduction to JavaScript and its role in web development, Variables, data types, and operators in JavaScript Control structures: loops and conditional statements, DOM manipulation for interactivity Event handling and form validation with JavaScript	8

5.	PHP and MySQL for Web Applications	Introduction to server-side scripting with PHP, Understanding PHP syntax and variables Working with forms and user input, connecting to MySQL database and performing basic CRUD operations, Building a dynamic web application with PHP and MySQL	6
Total number of Lectures			32
Evaluation Criteria			
Components		Maximum Marks	
Mid Term Examination		30	
End Semester Examination		40	
TA		30	
i) Attendance = 10			
ii) Assignments in PBL mode = 20			
Total		100	
<p>Students will work in groups of 2-3 to create HTML pages, style them with CSS, and build dynamic and interactive web pages using JavaScript. They will also explore web development frameworks to streamline their projects. The students will not only have acquired essential skills in web technologies but also possess project-based experience, boosting their employability prospects in the field of web development.</p> <p>Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)</p>			
Recommended Textbooks: Author(s), Title, Edition, Publisher, Year of Publication etc.			
1	Thomas A powell, “The complete reference HTML and CSS”, Tata McGrawHill Publications.		
2	Jeffrey C. Jackson, “Web Technologies: a Computer Science Perspective” Pearson, 2007.		
Recommended Reference Books: Author(s), Title, Edition, Publisher, Year of Publication etc.			
1	Stephen Holzner, “HTML Black Book” , Dreamtech Press, 2000.		
2	Rajkamal, “Internet and Web Technology”, Tata McGrawHill Education, 2017.		
3	Deitel, Deitel and Goldberg “Internet and World Wide Web How to Program”, Pearson, 2003		
4	Wendy Willard, “HTML Beginners Guide”, TataMcGraw-Hill, 2013		
5	Luke Welling and Laura Thomson, “PHP and MYSQL Web Development”, Pearson Education		

CO-PO and CO-PSO Mapping:

CO Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	1	1	1			1		1
CO2	3	2	2	1			1		2
CO3	3	2	2	2			1		1
CO4	3	2	2	2			1		2
Avg	2.5	1.75	1.75	1.5			1		1.5

Detailed Syllabus
Lecture-wise Breakup

Course Code NBA Code	23B61CA113 CBAC103	Semester ODD (specify Odd/Even)	Semester I Session 2024 -2025 Month from July'24 to Dec'24
Course Name	Multimedia Technology-I		
Credits	2-0-0	Contact Hours	2

Faculty (Names)	Coordinator(s)	Mr. Noor Mohammad
	Teacher(s) (Alphabetically)	Mr. Noor Mohammad

COURSE OUTCOMES		COGNITIVE LEVELS
C103.1	Discuss multimedia, its diverse applications, and advancement in hardware & software for it. Explain multimedia technologies and their diverse applications.	Understand (Level-2)
C103.2	Explain the elements of multimedia and their representation in computation. Discuss the components of multimedia technologies, such as text, graphics, audio, video and animation.	Apply (Level-3)
C103.3	Examine visually appealing layouts and relevant design elements to effectively design various publications. Use fundamental concepts of graphics to design magazine, logo, brochures and short animation.	Apply (Level-3)
C103.4	Explain the ethical and legal implications of multimedia development. Demonstrate the use of multimedia technologies for marketing purposes, promotional videos, interactive advertisements and campaigns.	Analyze (Level-4)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the Module
1.	Introduction to Multimedia	Media, Multimedia, Linear and Nonlinear multimedia, Diverse Applications of Multimedia-Education, Business, Research, Entertainments, etc., Hypermedia, Multimedia Authoring Tools.	2
2.	Computer Fundamentals	Evolution of Computer, Role of Microelectronics on Advancing Computers (backward compatibility), Von Neumann Digital Computer. Memory: ROM, RAM, Magnetic Disk, Laser (optical) Disk, SSD, Pendrive, etc. Printers, I/O devices, Software Basics, Hardware and Software Requirements for Multimedia. Analog vs Digital Media, Binary Computation.	5

3.	Multimedia Elements: Text and Image	Text: ASCII and Unicode Standards, Fonts. Raster and Vector Graphics: definition, properties, representation and application. Color Theory, Color Models (RGB, CMYK). Image: Analog vs Digital Image, Concept of Pixel, PPI, Resolution, Aspect Ratio, Color Depth, 8-bit, 16-bit, 24-bit Images. File Formats: GIF, PNG, JPEG, HEIC, TIFF, PSD, HDRI. Introduction to Adobe Photoshop and Illustrator: workspace and tools overview, concept of layers and masking.	8
4.	Multimedia Element: Audio	Sound, Properties of Sound, Amplitude and Frequency. Digitization of Sound, Sampling and Quantization. MIDI, MIDI vs Digital Audio, Intro to Musical Instruments and MIDI Interface. Audio System, Sound Card, Audio File Formats.	3
5.	Multimedia Elements: Video and Animation	Video and Animation: Fundamentals of Video and Animation, Video Quality, Codecs, File Formats. Basic Editing Techniques: Cutting, Trimming, Transitions and Effects.	5
6.	Multimedia Design	Visual Communication: Content and Form, Elements of Design-Space, Dot, Line, Shape, Form, Texture, Pattern, Color, The Principles of Design. Page Layout: The Gutenberg Diagram, F-Layout, Z-Layout, Visual Hierarchy, Headings, The Golden Ratio, The Grid System, Page Templates.	4
7.	Multimedia Development & Legal Issues	The Development Team, The Development Plan, Professional Issues In Multimedia Development, Copyright In The Age Of Digital Media, Digital Rights Management.	3
Total number of Lectures			30
Evaluation Criteria			
Components		Maximum Marks	
Mid Term Examination		30	
End Term Examination		40	
TA			
1. Attendance		05	
2. Assignments (15), PBL (10)		25	
Total		100	
Project based learning: Demonstrate the use of multimedia technologies for marketing purposes, promotional videos, interactive advertisements and campaigns in groups of maximum 3 students each, to illustrate the concepts covered in class.			
Recommended Textbooks: Author(s), Title, Edition, Publisher, Year of Publication etc.			
1.	V. Costello, Multimedia Foundations. CRC Press, 2023.		

2.	T. M. Savage and K. E. Vogel, An Introduction to Digital Multimedia. Jones & Bartlett Publishers, 2013.
Recommended Reference Books: Author(s), Title, Edition, Publisher, Year of Publication etc.	
1.	C. Chavez and A. Faulkner, Adobe Photoshop Classroom in a Book (2022 Release). Sydney: Pearson Education, Limited, 2021.
2.	T. Vaughan, Multimedia : making it work. New York: Mcgraw-Hill Education, 2014.
3.	Steinmetz, R. and Nahrstedt, K., Multimedia: Computing, communications and applications. New Delhi: Dorling Kindersley Pvt Ltd., 2013.
4.	P. Havaladar and G. Medioni, Multimedia Systems: Algorithms, standards, and industry practices. 2009. [Online]. Available: http://ci.nii.ac.jp/ncid/BB1242766X

CO-PO-PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1		2					2		
		Moderately able to identify and analyze advancement in multimedia.					Learning about multimedia advancements fosters ongoing learning to keep up with fast paced technologies.		
CO2	2	2	1		2		2		
	Moderately able to apply basic knowledge of math's, science and digital computing fundamentals	Moderately able to identify and analyze the encoding and processing of multimedia.	Slightly contributes to design and development of multimedia applications.		Moderately able to understand the importance of multimedia elements in effective communication.		Moderately able to understand evolving technology and learn to stay updated.		
CO3		2	1	1	2		2		1
		Moderately able to identify and analyze problems in designing.	Slightly contributes to design and development of multimedia applications.	Slightly involves modern tools usage to create design.	Moderately able to understand the use of design in effective communication.		Moderately able to learn and adapt trends to design various publications..		Slightly contributes to developing soft skills in mobile and app development.
CO4		2					2		
		Moderately able to identify and analyze legal problems in multimedia development..					Moderately able to stay updated with industry legal standards..		
Avg.	2	2	1	1	2		2		1

Fundamentals of Mathematics (23B31MA111)

Sets and their representation, Mapping or function, Relation and their representation, Limit and continuity, Tangent to a curve, Taylor's series, maxima and minima, Fundamental theorem of calculus, Definite integral as a limit of sum, Properties of definite Integrals, Algebra of matrices, Row echelon form, Rank of a matrix, Gauss elimination method, Eigenvalues and eigenvectors.

Course Description

Course Code	23B31MA111	Semester Odd	Semester I Session 2024-25 Month from July - Dec 2024
Course Name	Fundamentals of Mathematics		
Credits	3	Contact Hours	2-1-0
Faculty (Names)	Coordinator(s)	Dr. Shikha Pandey	
	Teacher(s) (Alphabetically)	Dr. Shikha Pandey	
COURSE OUTCOMES			COGNITIVE LEVELS
After pursuing the above-mentioned course, the students will be able to:			
C104.1	Recall the basics of set theory.		Remembering Level (C1)
C104.2	Explain the concepts of relations and functions, calculus of functions of one variable, matrices and determinants, eigenvalues and eigenvectors.		Understanding Level (C2)
C104.3	Solve problems related to differential and integral calculus.		Applying Level (C3)
C104.4	Apply the theory of matrices and determinants to solve a system of linear equations.		Applying Level (C3)
Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Sets, Relations and Functions	Sets and their representation. Union, intersection and compliment. Mapping or function. One-one, onto mappings, Inverse and composite mappings. Relation and their representation, types of relations, equivalence relation.	7
2.	Differential Calculus	Basic concept of limit and continuity. Derivative. Rules of differentiation. Tangent to a curve. Taylor's series. Maxima and minima.	7
3.	Basics of Integral Calculus	Fundamental theorem of calculus (statement only). Integrals of elementary functions. Definite integral as a limit of sum. Properties of definite integrals.	6
4.	Matrices	Algebra of matrices. Determinant of a square matrix. Row echelon form. Linear dependence and independence. Rank of a matrix, solution of system of	10

		equations, Gauss elimination method. Eigenvalues and eigenvectors.	
		Total number of Lectures	30
Evaluation Criteria			
Components		Maximum Marks	
T1		20	
T2		20	
End Semester Examination		35	
TA		25 (Quiz, Assignments, Tutorial, PBL)	
Total		100	
Project based learning: Students will be divided in a group of 4-5 to collect literature and submit a report on applications of matrices in computers.			
Recommended Reading material: Author (s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)			
1.	J. Hass, C. Heil, M.D. Weir , Thomas Calculus, 14 th Ed., Pearson Education, 2018.		
2.	R.K. Jain, S.R.K. Iyenger , Advanced Engineering Mathematics, 5 th edition, Alpha Science International, 2016.		
3.	E. Kreyszig , Advanced Engineering Mathematics, 10 th Ed., John Wiley, 2015.		
4.	Mathematics Textbooks for Class XI, XII, NCERT, 2019.		
5.	H. Anton and C. Rorres , Elementary Linear Algebra, 11 th Ed., Wiley, 2016.		

CO-PO and CO-PSO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
C104.1	1	1	1				1	1	
C104.2	2	2	2				2	1	
C104.3	3	2	2				2	1	
C104.4	3	2	2			1	2	1	
Avg.	2.25	1.75	1.75			1.00	1.75	1.00	

Course Description

Course Code NBA Code	23B31HS111 CBAC105	Semester Odd 2024	Semester I Session 2024-25 Month from Jul to Dec 2024
Course Name	English		
Credits	2	Contact Hours	2-0-0
Faculty (Names)	Coordinator(s)	Dr Suraj Das	
	Teacher(s) (Alphabetically)		
COURSE OUTCOMES: After the successful completion of this course, the student will be able to			COGNITIVE LEVELS
CO1	Demonstrate an understanding of English as a communication tool.		Understanding (C2)
CO2	Apply phonetics and grammar concepts for better pronunciation and presentation in written and oral communication.		Applying (C3)
CO3	Identify and use different literary and rhetorical devices.		Analyzing (C4)
CO4	Create different forms of Business Communication.		Creative (C6)
Module No.	Title of the Module	Topics in the Module	No. of Lectures
1.	English for Communication	Communication Process and Channels, Technical Communication Skills, Non-Verbal Communication Skills and Body Language, Dynamics of Professional Presentation Gambits and Small Talk	8
2.	Pronunciation	Features of English Phonology, Introduction to International Phonetic Alphabet	4
3.	Written Business Communication	Business Letters and Resume, Email Messages, Memorandum, Technical Reports, Other Business Writings: Circulars, Notice, Agenda and Minutes	10
4.	Vocabulary Enrichment & Grammar	Essentials of Grammar, Applied Grammar and Usage: Tense, Aspect, Mood and Voice, Building Advanced Vocabulary	4
5	Rhetorics	Literary Devices	2
Total number of Lectures			28
Evaluation Criteria			
Components		Maximum Marks	
Mid Term		30	
End Semester Examination		40	
TA		30 (Quiz, Assignments, Project, Class Attendance & Participation)	
Total		100	
PBL Component: The project is to be done in a group of 3-4 students. Students will be asked to write a proposal with a well-researched technical report on any social issue.			

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc.
(Text books, Reference Books, Journals, Reports, Websites etc)

1.	C.L. Bovee, J.V.Thill, and M.Chaturvedi, <i>Business Communication Today</i> ,9 th Ed, Pearson Education, copyright@ Dorling Kinderslay (India) Pvt Ltd,2009
2.	K. M. Quintanilla and S.T.Wahl, <i>Business and Professional Communication</i> , Sage Publications Pvt India Ltd,2011
3.	S. Kumar, P. Lata, <i>Communication Skills</i> , Oxford University Press,1 st , Ed. 2011
4.	R.K Bansal, J.B Harrison, <i>Spoken English for India</i> , Orient Longman, 2018
5.	M A Yadugiri, <i>The Pronunciation of English: Principles and Practice</i> , Viva Books Pvt. Ltd, India, 2015
6.	A. R. Rizvi, <i>Effective Technical Communication</i> , 2nd edition, McGraw Hill Education Private Limited, Chennai, 2018.
7.	R. Murphy, <i>English Grammar in Use</i> , 4 th edition, Cambridge University Press, 2012.
8.	M. Hewings, <i>English Pronunciation in Use. Advanced</i> . Cambridge: CUP, 2009
9.	K. Mohan, N. P. Singh, <i>Speaking English Effectively</i> 2nd Edition. Macmillan Publishers India Ltd. Delhi. 2011
10.	E. S. Kumar, P. Sreehari, <i>A Handbook for English Language Laboratories</i> . New Delhi: Foundation, 2009.

Detailed Syllabus
Lecture-wise Breakup

Course Code NBA Code	23B66CA114 CBAC106	Semester: Odd	Semester: I Session: 2024- 2025 Month from July to December
Course Name	Introduction to Digital Technologies		
Credits	2-0-0	Contact Hours	2

Faculty (Names)	Coordinator(s)	Dr. Sonal
	Teacher(s) (Alphabetically)	Dr. Prateek Srivastava

COURSE OUTCOMES		COGNITIVE LEVEL
At the end of the course, students will be able to:		
CO1	Understand computer hardware and software basics.	Understand (Level 2)
CO2	Understand the concepts of various digital technologies.	Understand (Level 2)
CO3	Explore contemporary tools and frameworks for digital technologies.	Understand (Level 2)
CO4	Apply digital technologies for a given problem.	Apply (Level 3)
CO5	Analyze a given problem to choose appropriate digital technology.	Analyze (Level 4)

Mod ule No.	Subtitle of the Module	Topics in the Module	No. of Lectures for the module
1.	Computer Basics	Introduction, Components, Type of Computers, Number System and Base Conversions	3
2.	Software Fundamentals	Introduction, System Software, Operating System, Application Software and its types, Algorithms, Flowchart and Pseudocode	3
3.	Artificial Intelligence and Machine Learning	Introduction to AI, ML Fundamentals, ML Algorithms (Classification and Clustering), Training and Evaluation, Applications	5
4.	Data Analytics and Big Data	Introduction, Data Collection and Preprocessing, Exploratory Data Analysis, Data Analytics Techniques, Data Visualization Techniques, Data Storage and Management, Big Data Technologies and Ecosystem, Applications and Future Trends	5
5.	Cloud, Fog and Edge Computing	Introduction to Cloud, Fog and Edge Computing, Cloud Service and Deployment Models, Use Cases and Applications, Cloud Computing Tools, Real-World Implementation and Case Studies	4
6.	Internet of Things	Introduction, Features, Advantages and Disadvantages, IoT Devices, IoT Framework, IoT Applications, IoT Development Kit	4
7.	Augmented Reality and Virtual Reality, UI, UX	Introduction to Augmented Reality and Virtual Reality, UI and UX Design for AR and VR, Designing Interactions and Gestures in AR and VR, AR and VR Accessibility and Inclusivity, Design Challenges and Future Trends in AR and VR	4
Total number of Lectures			28

Evaluation Criteria	
Components	Maximum Marks
Mid Semester Examination	30
End Semester Examination	40
TA	30 (Attendance (10), Quiz/ Assignment (10), Mini-Project (10))
Total	100

Project based learning: Each student in a group of 3-4 will solve a real-world application using the digital technologies. They will give a practical demonstration of the problem and its solution which will help their employability into IT sector.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

Text Books	
1.	Rajaraman, V., and Neeharika Adabala. Fundamentals of computers. PHI Learning Pvt. Ltd., 2014.
2.	Foster Provost and Tom Fawcett. Data Science for Business. O'Reilly Media, Inc, 2013.
3.	Hyatt Saleh. Machine Learning Fundamentals. Packt Publishing, 2018.
4.	Vecchiola, Christian., Selvi, S.Thamarai., Buyya, Rajkumar. Mastering Cloud Computing: Foundations and Applications Programming. Netherlands, Elsevier Science, 2013.
Reference Books	
1.	Erin Pangilinan, Steve Lukas, Vasanth Mohan, Creating Augmented and Virtual Realities, O'Reilly Media, Inc.
2.	Vijay Madiseti, Arshdeep Bahga, "Internet of Things, "A Hands on Approach", University Press, 2015.

CO-PO-PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1 Learning computer hardware and software basics						1 Learning computer hardware and software basics	1 Learning computer hardware and software basics	
CO2	1 Learning various digital technologies						1 Learning various digital technologies	1 Learning various digital technologies	
CO3	1 Exploring contemporary tools and framework			2 Exploring contemporary tools and framework for digital technologies			2 Learning different tools and frameworks for digital technologies	2 Learning different tools and frameworks for digital technologies	
CO4	2 Given a problem, applying relevant digital technologies		2 Design the solution for a given problem	3 Apply digital technology tools for a given problem	2 For a given problem, discuss and implement appropriate digital technologies	2 Collaborate to apply digital technology for a given problem	3 Solving a problem using digital technologies	3 Given a problem, applying relevant digital technologies	

			lem usin g vari ous digit al tech nolo gies	m	s	m			
CO5	2 Given a real-world application, analyze the problem to apply relevant digital technologie s	3 Analyze a problem to choose appropri ate digital technolo gy		3 Analyz e a proble m to apply appropri ate digital technol ogy tool	2 For a given problem, analyze and apply appropriate digital technologie s	2 Collabo rate to analyze a proble m to apply appropri ate digital technol ogy	3 Analyze a problem to apply appropriate digital technology	3 Analyze a problem to apply appropriate digital technology	

Course: Environmental Science
Course Code: 23B12BT111
BCA (Odd sem-2024)

Brief Outline of the course:

The Multidisciplinary nature of environment, principles of Biodiversity & conservation, overview of various Natural resources including Energy, their consumption & conservation strategies, different forms of Pollution, hazardous waste management, Urban planning, Disaster management, Environmental Policies, Laws, Regulations, ethics and a Field Work component that appraises students with issues in environment in current context.

Detailed Syllabus
Lecture-wise Breakup

Subject Code	23B12BT111	Semester: Odd	Semester: I Session: 2024-2025
NBA Code	CBAC107		Month from: July-Dec
Subject Name	Environmental Science		
Credits	2	Contact Hours	2-0-0

Faculty (Names)	Coordinator(s)	Dr. Ekta Bhatt
	Teacher(s) (Alphabetically)	Dr. Nivedita, Dr. Ekta Bhatt

COURSE OUTCOMES		COGNITIVE LEVELS
After pursuing the above-mentioned course, the students will be able to:		
CO1	Explain fundamental principles of environment, ecosystem resources, biodiversity and conservation	Understand Level (C2)
CO3	Interpret global environmental resource status, associated concerns, Government regulations & Environmental Laws	Understand Level (C2)
CO2	Identify pollution hazards, environmental impacts of pollution and learn environmentally safe and sustainable solutions	Apply Level (C3)
CO4	Make use of real-time data on specific environmental aspects, examine risks involved, make a field report and present the findings	Analyse Level (C4)

Module No.	Subtitle of the Module	Topics in the module	No. of Lectures for the module
1.	The Multidisciplinary nature of environment	Definition, scope and importance, Need for public awareness, Types of Ecosystems, Ecosystem resources and functioning, Case studies.	3
2.	Biodiversity & conservation	Diversity of flora and fauna, species and wild life diversity, Biodiversity hotspots, threats to biodiversity, Case studies	3
3.	Natural resources, Energy consumption & conservation	Water, Land, Energy (Renewable, non-renewable and sustainable) resources, Global Conventions on Energy, Kyoto protocol, Paris convention, Case studies.	8
4.	Pollution, hazardous waste management	Air, Water & Land, pollution, sources & causes, effects, Electronic waste, nuclear hazards, Case studies.	6
5.	Sustainability and Disaster management	Sustainability and UN goals, Disaster Management and Contingency Planning, Critical issues concerning global warming, climate change, acid rain, ozone depletion and Case studies	4
6	Environmental Policies, Laws, Regulations & ethics	Environmental Policy and laws, Different Acts such as: Environmental Protection Act, Air and Water Acts, Wildlife and Forest Acts), SPCB and CPCB, their roles and responsibilities.	2
7	Field Work/	Explore the current environment related occurrences at national and international level, Study of successful sustainable measures, a know-how of industries in local region and their possible effects, measure of water, air and land quality, Visit to a local polluted site-Urban/Rural /Industrial / Agricultural, Study of simple ecosystems.	2
		Total number of Lectures	30

PBL: Visit to a local polluted site-Urban/Rural /Industry/Agricultural, Survey ground situation on specific environmental aspects, and their possible impacts on water, air and land quality, identify risks involved, make a field report and present the findings

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

Benny Joseph, Environmental Studies Simplified, 3rd Edition, McGraw Hill Education, India, Published 2nd August, 2017

Erach Bharucha, Textbook of Environmental Studies for UG Courses, 3rd Edition, Orient Black Swan, Published 1st Jan 2013

Issues of the Journal: Down to Earth, Published by Centre for Science and Environment (CSE), Delhi

EVALUATION:

Mid Semester
Examination - 30 marks
End Semester
Examination - 40 marks
Teachers Assessment (TA)
- 30 marks

CO-PO and CO-PSO Mapping:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2
CO1					3						
CO2				1	2	3		1	2		
CO3				2	2	3		1	2		
CO4					3	2	2	3	2		
Avg				2	3	3	2	2	2		

Detailed Syllabus

Lab-wise Breakup

Course Code	23B65CS114	Semester ODD	Semester: 1st Session: 2024 -2025
NBA Code	CBAC151		Month from: July'2024 –Dec'2024
Course Name	Fundamentals of Programming Lab		
Credits	1	Contact Hours	0-0-2

Faculty (Names)	Coordinator(s)	Dr. Shardha Porwal
	Teacher(s) (Alphabetically)	Dr. Shobhit Tyagi, Ms. Mayuri

COURSE OUTCOMES		COGNITIVE LEVELS
CO1	Introduce algorithmic thinking with pseudo code to solve Problem. Describe various data types, memory allocation schemes, arithmetic and logical operation precedence, and the need for arrays and structures. Introduce algorithmic thinking with pseudocode and flowchart to solve problems.	Understanding Level (C2)
CO2	Represent and draw the flowchart and compose the high-level code for various problems. Describe various data types, memory allocation schemes, arithmetic and logical operator precedence, and the need for arrays and structures.	Understanding Level (C2)
CO3	Apply critical thinking skills to choose the appropriate data types, i.e., Array, Structures, and Union for a given problem.	Applying Level (C3)
CO4	Implement functions with and without pointers for different problems.	Applying Level (C3)
CO5	Compare the solutions using various searching (Linear, Binary) and sorting (Bubble, Selection, and Insertion) algorithms.	Analyzing Level (C4)

Module No.	Title of the Module	Topics in the Module	No. of Weeks (2 Labs/Week)
1	Flow chart and Logic Building	Developing logic/flow-chart/pseudocode to solve problems, simple/logical games, puzzles	2 Weeks
2	Data Type, Statements, Expressions,	Data, variables and constants, data types, operators – binary, unary, ternary, operator precedence, associativity	2 Week

	Operators		
3	Control Flow	Develop C programs using conditional structure (if, if-else, nested if), and iterative control structure (do-while, while, for). Implement switch case statements.	2 Weeks
4	Array and String	Array initialization, reading and writing operations with array, one dimensional, two-dimensional array, strings, and related operations like addition, multiplication, traversal, transpose etc.	2 Weeks
5	Functions	User defined functions and inbuilt functions, Functions definition, declaration, calling, Pass by value, functions with array	2 Week
6	Structures and Union	Struct keyword, Structure and Union, Structure variable, dot operator, arrow operator, Array of Structures, structure using functions.	2 Weeks
7	Pointers and searching, sorting techniques	Pointers in C, 1D/2D array and structures, Arithmetical operations on pointers, Implement searching and sorting techniques	2 Weeks
Total Number of Weeks			14 Weeks

Evaluation Criteria

Components	Maximum Marks
Lab Test -1	20
Lab Test -2	20
Day to Day	60
Evaluation 1	10
Quiz	10
Weekly Assignment	10
Project	15
Attendance	15
Total	100

Project-based learning: Students will make an application in C Language (in a group of 3-4 students). Students must develop an application in C that uses all the C constructs covered in the class.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1	Deitel, Paul; Deitel, Harvey, C: How to Program (8 Edition.). Pearson. ISBN 978-0133976892, 2015.
2	Perry, Greg; Miller, Dean, C Programming: Absolute Beginner's Guide (3 ed.). Que. ISBN 978-0789751980, 2013.
3	C Programming : The Definitive Beginner's Reference, Harry H. Chaudhary, First MIT-Createspace-Inc, 2014.
4	Programming in ANSI C, E Balagurusamy, 8th Edition, Mc Graw Hill 2019,

5	Stroustrup, Bjarne, The C++ Programming Language (Fourth ed.). Addison-Wesley. ISBN 978-0-321-56384-2, 2013.
6	Nixon, Robin. Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5. " O'Reilly Media, Inc.", 2014.
7	David Griffiths, and Dawn Griffiths “Head First C 1/e Edition”, O’Reilly Publication, 2012.
8	D. S. Malik, “C++ Programming: From Problem Analysis to Program Design, 6th Edition, Course Technology, Cengage Learning, 2012
9	Peter Prinz, Tony Crawford, “C in a Nutshell, 2nd Edition, O’Reilly , 2016.
10	Mittal, Mandeep, & Porwal, Shardha, “C Programming”, Alpha Science International Limited, 2016

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3 2	1 2	1 2	1	1		1		1
	Moderately, Associating the knowledge of fundamentals to develop C programs Strongly, understand fundamental knowledge in flowchart designing	Slightly, understand a problem to develop C programs Moderately, exemplifyin g a problem	Slightly, extending fundamentals of the C programs Moderately, summarizing the solution as a flowchart	Slightly, understand the limitations of technologies while applying them effectively to flowchart designing	Slightly, present a report on the design and development of a C program		Slightly, able to engage in life long learning		Slightly, exemplifying programming skills in C programs development Slightly, relating flowchart designing in C program development
CO2	3 2	2 1	2 1	1	1	1	1		1
	Strongly, understand fundamental knowledge in flowchart designing Moderately, Associating the knowledge of fundamentals	Moderately, exemplifyin g a problem Slightly, understand a problem to develop C programs	Moderately, summarizing the solution as a flowchart Slightly, extending fundamentals of the C programs	Slightly, understand the limitations of technologies while applying them effectively to flowchart designing	Slightly, present a report on the design and development of a C program	Slightly, understand the limitations of technologies while applying them effectively to flowchart designing	Slightly, able to engage in life long learning		Slightly, relating flowchart designing in C program development Slightly, exemplifying programming skills in C programs

	to develop C programs					em ent principles			development
CO3	3	1	3	1		1	1		2
	Highly, applying logical abilities to implement arrays, structure.	Slightly, analyzing problem for development of C programs	Highly, develop C programs using array, structure and union	Slightly, inspect the limitations of technologies while applying them effectively to develop C programs			Slightly, able to engage in life long learning		Moderately, integrating array, structure and union designing in C program development
CO4	3	2	3				1		2
	Strongly, Applying function and pointers to develop C programs	Moderately, interviewing a program into the small components	Highly, develop C programs using functions and pointers				Slightly, able to engage in life long learning		moderately, integrating function and pointers designing in C program development
CO5	2	3	1				1		2
	Strongly, Analyze the searching sorting techniques in C program development	Moderately, Structuring the role of searching and sorting techniques to develop C program	Strongly, develop C programs using searching and sorting techniques				Slightly, able to engage in life long learning		Moderately, Linking searching sorting techniques in C program development

Detailed Syllabus
Lab-wise Breakup

Course Code NBA Code	23B65CA115 CBAC152	Semester Odd	Semester ODD	Session 2024 -2025 Month from July'24 to Dec'24
Course Name	Web Technology Lab			
Credits	1	Contact Hours	0-0-2	
Faculty (Names)	Coordinator(s)	Dr. Shweta Rani		
	Teacher(s) (Alphabetically)	Dr. Shweta Rani, Dr. Rajiv Mishra, Ritika		

COURSE OUTCOMES		COGNITIVE LEVELS
C152.1	Build a webpage using HTML tags	Apply (Level 3)
C152.2	Apply client-side scripting language for a simple webpage	Apply (Level-3)
C152.3	Apply Basics of PHP for creating a webpage	Apply (Level-3)
C152.4	Build Dynamic web application with PHP and MSQL	Apply (Level-3)

Module No.	Title of the Module	List of Experiments	COs
1.	Web page Designing using HTML	Basic structure of HTML, Tags such as Headings, Paragraphs, Formatting, images, Tables, Lists with different attributes.	C152.1
2.	Creating Cascading Style Sheets (CSS)	CSS Introduction, style rules, colors, backgrounds, borders, fonts, links, list, tables, text.	C152.1
3.	Basic Programming on JavaScript	JS Introduction, Inclusion, Output, Variables, Data Types, Operators, Strings and Functions	C152.2
4.	Form Handling using JavaScript	HTML forms, client-side scripting using JavaScript	C152.2

5.	Basics of PHP	Overview of PHP, Basic command with PHP examples	C152.3
6.	Database handling using MySQL	Overview of MYSQL, creating database, selecting a database, listing database and table names, creating a table, inserting data, altering tables and data, deleting database, deleting data and tables	C152.4
7.	Application Development	Develop Dynamic web application to solve real world problems	C152.4

Evaluation Criteria	
Components	Maximum Marks
Eval 1	15
Eval 2	15
Lab Test 1	20
Lab Test 2	20
PBL	20 (Students will submit the mini project in a group of 3-4 members)
Attendance	10
Total	100

Project based learning: Students in a group of 3-4 will be develop a web application using the web technologies covered as part of this course. Students will be required to develop a web application using HTML, CSS, JS while handling the various facets of server-side scripting and database handling. This will give students hands on experience of working in the area of web technology. The knowledge gained will enhance their employability in the IT sector.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	Laura Lemay, Rafe Colburn, Jennifer Kymin, "Mastering HTML, CSS & JavaScript Web Publishing", BPB Publications
2.	Thomas A. Powell, "HTML & CSS: The Complete Reference", TMH
3.	AviSilberschatz, Henry F. Korth, and S. Sudarshan, "Database System Concepts", 6th edition, McGrawHill, 2010.
4.	Lynn Beighley & Michael Morrison, "Headfirst PHP & MySQL", O'Reilly, 1st Edition

CO-PO and CO-PSO Mapping:

CO Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	1	1	1			1		1
CO2	3	2	1	1			1		2
CO3	3	1	1	2			1		1
CO4	3	2	1	1			1		2
Avg	2.75	1.5	1	1.25			1		1.5

Detailed Syllabus
Lab-wise Breakup

Course Code NBA Code	23B65CA116 CBAC153	Semester ODD (specify Odd/Even)	Semester 1 Session 2024 -2025 Month from July 2024 to Dec 2024
Course Name	Multimedia Technology-I Lab		
Credits	1	Contact Hours	0-0-2

Faculty (Names)	Coordinator(s)	Akshit Raj Patel
	Teacher(s) (Alphabetically)	Mr. Akshit Raj Patel, Mr. Noor Mohammad, Ms. Purtee Kohli

COURSE OUTCOMES		COGNITIVE LEVELS
CO1	Explain fundamentals of multimedia technologies.	Understand(level-2)
CO2	Outline the technical aspects of multimedia systems and applications including performance, compatibility and scalability.	Understand (level-2)
CO3	Create and manipulate raster graphics for various digital media applications, demonstrating proficiency in professional image editing software.	Apply (level-3)
CO4	Develop proficiency in vector graphics techniques to create scalable illustrations, including logos, icons, and infographics.	Apply (level-3)
CO5	Develop a static website and blogs incorporating multimedia elements and basic interactivity using HTML, CSS, and JavaScript.	Apply (level-3)

Module No.	Title of the Module	Topics in the Module
1.	Introduction to Visual Design	<p>Overview of raster and vector graphics, Introduction to design principles and elements.</p> <p>Selecting appropriate software tools for design projects.</p> <p>Understanding the importance of storyboards in visual media.</p>

2.	Raster Graphics and Visual Designing Basics	Workspace and tools overview, fundamentals of colors, selection tools, changing color modes, concept of layers and layer masking , PSD file format Practice Problem: Create a surreal landscape by combining at least 3 different images using layer masking and blending modes.														
3.	Vector Graphics and Creating Posters, flyers	Adding borders or frames around an image using layers, designing a poster and cover page of a magazine. Incorporating images and text cohesively Practice Problem: Design a movie poster for a fictional film, incorporating text, images, and special effects to create a compelling visual narrative.														
4.	Logo Designing	Workspace and tools overview, selection tools, pen tool, simple and complex design, transform and its operations, working with shapes, path and typography, Logo designs.														
5.	Creating Interactive Website Elements	Adding buttons, navigation menus, and forms. Incorporating multimedia elements (images, videos). Finalizing the personal website design. Understanding blog design principles and creating engaging blog post layouts, designing a sample blog page.														
Evaluation Criteria <table border="0" style="width: 100%;"> <tr> <td>Evaluation 1</td> <td style="text-align: right;">15</td> </tr> <tr> <td>Evaluation 2</td> <td style="text-align: right;">15</td> </tr> <tr> <td>Lab Test 1</td> <td style="text-align: right;">20</td> </tr> <tr> <td>Lab Test 2</td> <td style="text-align: right;">20</td> </tr> <tr> <td>PBL</td> <td style="text-align: right;">20 (Students will submit the mini project in a group of 2-3 members)</td> </tr> <tr> <td>Attendance</td> <td style="text-align: right;">10</td> </tr> <tr> <td>Total</td> <td style="text-align: right;">100</td> </tr> </table>			Evaluation 1	15	Evaluation 2	15	Lab Test 1	20	Lab Test 2	20	PBL	20 (Students will submit the mini project in a group of 2-3 members)	Attendance	10	Total	100
Evaluation 1	15															
Evaluation 2	15															
Lab Test 1	20															
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Attendance	10															
Total	100															
Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)																
Recommended Textbooks: Author(s), Title, Edition, Publisher, Year of Publication etc.																
1	“Adobe Photoshop Help.” Available: https://helpx.adobe.com/pdf/photoshop_reference.pdf															
2	“Adobe Illustrator Help.” Available: https://helpx.adobe.com/pdf/illustrator_reference.pdf															
Recommended Reference Books: Author(s), Title, Edition, Publisher, Year of Publication etc.																
1	Chavez, Conrad, and Andrew Faulkner. <i>Adobe Photoshop Classroom in a Book (2020 Release)</i> . Adobe Press, 2019.															
2	Team, Adobe Creative. <i>Adobe illustrator CS6 classroom in a book</i> . Adobe Press, 2012.															

3	Vaughan, Tay. <i>Multimedia making it work</i> . McGraw-Hill, Inc., 1998.
4	Robin Williams. <i>The Non-Designer'S Design Book</i> , 3/E. Pearson Education India, 2008.
5	Goldberg, Eric. <i>Character Animation Crash Course !</i> . Los Angeles, CA: Silman-James Press, 2008.
6	Pincus, Edward, and Steven Ascher. "The filmmaker's handbook." (<i>No Title</i>) (1984).
7	Duckett, Jon. <i>Web design with HTML, CSS, JavaScript and jQuery set</i> . Wiley Publishing, 2014.

CO-PO-PSO Mapping									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	2			2		1		
	This result somewhat corresponds with the application of basic knowledge.	Grasping multimedia concepts slightly aligns with the process of problem analysis.			Understanding multimedia elements is crucial for effective communication.		Understanding multimedia is essential for building a solid foundation of knowledge.		
CO2	3	2		2	3			3	2
	This result directly involves utilizing computer graphics knowledge	Design/ development of solutions		Conduct investigations of complex problems	Modern tool usage.			Design and develop multimedia systems and applications	Analyze and optimize multimedia content and systems
CO3	2	2		3	2		2		
	This outcome directly involves applying knowledge of computer graphics to design raster graphics.	Designing inherently involves problem analysis.		This result significantly enhances the application of contemporary tools, such as vector graphic software, video editing, and animation tools.	Designing poster, flyers and working with multimedia tools inherently involves effective presentation through visual elements.		Engaging with new tools and technologies in vector graphics is a valuable component of lifelong learning.		
CO4	3	2		3	3		2		2
	Utilizing multimedia authoring tools effectively aligns with the application of foundational knowledge.	Creating interactive and engaging content involves problem analysis.		Applying multimedia authoring tools directly contributes to modern tool usage.	The use of multimedia enhances effective communication skills.		Applying multimedia authoring tools implies a continuous learning process.		Designing the logo for buisness
CO5	2	2		2			2		3
	Evaluating technical aspects requires a solid foundation in basic knowledge.	It involves problem analysis, as it requires identifying and addressing technical challenges in multimedia systems.		Modern tools are used to assess the performance, compatibility, and scalability of multimedia systems			Slightly, implies a continuous learning process.		Designing the UI and UX of a static website.
Avg.	2.2	2	0	2	2	0	1.5	0.6	1.4