

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR

(An Autonomous Institute)



Affiliated to

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, UTTAR PRADESH LUCKNOW



Evaluation Scheme & Syllabus

For

Bachelor of Computer Applications (BCA)

First Year

(Effective from the Session: 2026-27)

NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute)

BCA

Evaluation Scheme

SEMESTER I

Sl. No.	Subject Codes	Subject Name	Types of Subjects	Periods			Evaluation Schemes				End Semester		Total	Credit
				L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	DBCA0101	AI Essentials for Computing	Mandatory	2	0	0	30	20	50		50		100	2
2	DBCA0102	Basics of Data Analytics using Spreadsheet	Mandatory	3	0	0	30	20	50		100		150	3
3	DBCA0103	C Programming	Mandatory	3	0	0	30	20	50		100		150	3
4	DBCA0104	Design Thinking I	Mandatory	2	0	0	30	20	50		50		100	2
5	DBCA0105	Environmental Science and Sustainability	Mandatory	2	0	0	30	20	50		50		100	2
6	DBCA0106	Introduction to Matrices and Calculus	Mandatory	3	0	0	30	20	50		100		150	3
7	DBCA0152	Basics of Data Analytics using Spreadsheet Lab	Mandatory	0	0	2				50		50	100	1
8	DBCA0153	C Programming Lab	Mandatory	0	0	2				50		50	100	2
9	DBCA0158	Workplace Communication Lab 1	Mandatory	0	0	4				50		50	100	2
10	DBCA0159	Yoga	Mandatory	0	0	2				50			50	NA
		TOTAL							300	150	450	150	1050	20

List of MOOCs (Infosys Springboard) Based Recommended Courses for First Year (Semester-I) BCA

S. No.	Subject Code	Course Name	University/Industry Partner Name	No. of Hours
1	DMC0018	C Programming Course	Infosys Wingspan (Infosys Springboard)	8h 49m
2	DMC0019	Analytic Using Excel-Part2	Infosys Wingspan (Infosys Springboard)	6h 2m

Abbreviation Used:

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam.

CE: Core Elective, OE: Open Elective, DE: Departmental Elective, PE: Practical End Semester Exam, CA: Compulsory Audit,

MOOCs: Massive Open Online Courses.

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Evaluation Scheme

SEMESTER II

S. No	Subject Codes	Subjects Name	Types of Subjects	Periods			Evaluation Schemes				End Semester		Total	Credit
				L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	DBCA0201	Business Intelligence & Analytics	Mandatory	3	0	0	30	20	50		100		150	3
2	DBCA0202	Data Structure	Mandatory	3	0	0	30	20	50		100		150	3
3	DBCA0203	Introduction to Networks	Mandatory	3	0	0	30	20	50		100		150	3
4	DBCA0204	Statistics for Computer Applications	Mandatory	3	0	0	30	20	50		100		150	3
5	DBCA0251	Business Intelligence & Analytics Lab	Mandatory	0	0	2				50		50	100	1
6	DBCA0252	Data Structure Lab	Mandatory	0	0	2				50		50	100	1
7	DBCA0253	Introduction to Networks Lab	Mandatory	0	0	2				50		50	100	1
8	DBCA0255	Problem Solving using python	Mandatory	0	0	6				50		100	150	3
9	DBCA0258	Workplace Communication Lab 2	Mandatory	0	0	4				50		50	100	2
10	DBCA0259	Field Activities for Community Engagement	Mandatory	0	0	2				50			50	NA
		TOTAL							250	250	400	250	1150	20

List of MOOCs (NPTEL) Based Recommended Courses for First Year (Semester-II) BCA

S. No.	Subject Code	Course Name	University/ Industry Partner Name	No. of Hours
1.	DMC0020	Introduction to Python	IIHT	24h 6m
2.	DMC0014	Data Structures and Algorithms using Python - Part 1	IIHT	29h 27m

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MOOCs: Massive Open Online Courses.

Course Code: DBCA0101			Course Name: AI Essentials for Computing					L	T	P	C
Course Offered in: BCA 1 st Year								2	0	0	2
Pre-requisite: Basic Programming, Basic Data Interpretation Skills											
Course Objectives:											
The objective of this course is to introduce the fundamental concepts and history of Artificial Intelligence, provide an understanding of data literacy and analysis, develop a basic understanding of prompt engineering and the functioning of AI tools, and familiarize students with ethical and responsible use of AI technologies for computing applications.											
Course Outcome: After completion of the course, the student will be able to								Bloom’s Knowledge Level (KL)			
CO1	Summarize the foundations, history, and applications of AI and Intelligent Agents.							K2			
CO2	Interpret and differentiate types of data.							K4			
CO3	Apply the basic concepts of Prompt Engineering.							K3			
CO4	Evaluate AI ethics, biases, compliance, and							K4			
CO5	analyze AI features to enhance writing and data tasks in office tools.							K5			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1		2	2	2	2	2	2	2	2		
CO2		2	2	2	2	2	2	2	2		
CO3		2	2	2	2	2	2	2	2		
CO4		1	2	2	3	2	1	3	2		
Course Contents / Syllabus											
Unit-1		Introduction to Artificial Intelligence							07 hours		
Introduction to Artificial Intelligence, History of AI, Applications of AI, Intelligent Agents, Types of Intelligent Agents, Domains of AI: Machine Learning, Deep Learning, Natural Language Processing, Computer Vision, Generative AI, Applications of AI, AI Control Tower.											
Unit-2		Data Literacy and Analysis							07 hours		
Importance of Data, Information, Knowledge, Wisdom, Types of Data [Structured and Unstructured], Data Collection, Data Processing, Data Analysis – Descriptive and Inferential.											
Unit-3		Prompt Engineering & AI in Office Tools							09 hours		
Concept and importance of Prompt Engineering, Types of prompts: zero-shot, few-shot, chain-of-thought, Principles of effective prompt creation. Introduction to Microsoft Copilot and Google Gemini in Docs and Sheets, AI features in MS Word: content suggestions, grammar checks, summarization, AI features in MS Excel: smart fill, charts, formula predictions.											
Unit-4		Ethics and Responsible AI							07 hours		
Introduction to AI Ethics, Need for Responsible AI, Ethical Use of AI Tools, AI Content Generation, Biases in AI, Types of Bias in AI, Bias Mitigation, Privacy and Data Protection, Transparency in AI, AI Rules and Regulations, Accountability in AI Systems.											
								Total Lecture Hours		30 hours	
Textbooks:											
							Authors Name				
1. Artificial Intelligence: A Guide for Thinking Humans, Penguin Books, 2019							Melanie Mitchell				
2. Hands-On Artificial Intelligence for Beginners, 2021							Patrick D. Smith				
3. Prompt Engineering for Generative AI, 2023							Nathan Hunter				
Reference Books:											
							Authors Name				
1. Introduction to Artificial Intelligence, Springer, 2025							Wolfgang Ertel				
2. Data Science from Scratch, 2 nd edition 2019							Joel Grus				
3. Responsible Artificial Intelligence: How to Develop and Use AI in a Responsible Way, 2019							Virginia Dignum				
Self-Study Content Links:								Duration (in Hrs)			
MOOCs		Google AI Essentials (Coursera)						10 Hrs			



NIET
Greater Noida
Autonomous Institute

Noida Institute of Engineering & Technology, Greater Noida

नोएडा अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, ग्रेटर नोएडा

(An Autonomous Institute)

Approved by AICTE, Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Lucknow Uttar Pradesh, (Formerly Uttar Pradesh Technical University)



Video Lectures	https://www.youtube.com/watch?v=ad79nYk2keg https://www.youtube.com/watch?v=JMUxmLyrhSk https://www.youtube.com/watch?v=b_krXFeOEDU	00 Hrs 15 Min 00 Hrs 19 Min 00 Hrs 12Min
Web References	https://www.deeplearning.ai/short-courses/ https://ai.google/responsibility/	

Course Code: DBCA0102				Course Name: Basics of Data Analytics using Spreadsheet				L	T	P	C	
Course Offered in: BCA 1 st Year								3	0	0	3	
Pre-requisite: Basic knowledge of computer terminology.												
Course Objectives:												
The objective of this course is to supervise students with a comprehensive understanding of Microsoft Excel from basic operations to advanced data analysis and visualization techniques.												
Course Outcome: After completion of the course, the student will be able to									Bloom’s Knowledge Level (KL)			
CO1	Apply operation of Excel's interface, data entry and formatting to create and manage spreadsheets effectively							K3				
CO2	Apply essential formulas and functions to perform calculations and data analysis efficiently							K3				
CO3	Develop skills in sorting, filtering and using tables to organize and analyze large datasets.							K5				
CO4	Apply advanced functions, Pivot tables, and what-if analysis tools to enhance data insights and decision-making.							K3				
CO5	Create and customize charts and dashboards to visualize data and present information clearly and effectively.							K5				
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)												
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8				
CO1	2	1	1	3	2	1	1	2				
CO2	2	2	2	3	2	1	1	2				
CO3	2	3	2	3	2	1	1	2				
CO4	2	3	3	3	2	2	1	3				
CO5	1	2	3	2	3	2	1	3				
Course Contents / Syllabus												
Unit-1	INTRODUCTION TO EXCEL								9 hours			
Overview of Excel Interface: Ribbon, Tabs, and Quick Access Toolbar, Workbook and Worksheet Navigation, Understanding Cells, Rows, and Columns, Basic Operations: Workbook and Worksheet Navigation, Creating, Saving, and Opening Workbooks, Entering and Editing Data, Using Autofill and Flash Fill, Basic Formatting: Formatting Cells (Font, Color, Alignment), Number Formatting (Currency, Date, Percentage), Adjusting Row Height and Column Width.												
Unit-2	WORKING WITH FORMULAS AND FUNCTIONS								9 hours			
Basic Formulas: Understanding Formulas and Calculation Operators, Creating Simple Formulas (Addition, Subtraction, Multiplication, Division), Common Functions: Using SUM, AVERAGE, MIN, MAX, and COUNT, Understanding and Using Absolute and Relative References, Logical and Lookup Functions: IF Statements, VLOOKUP and HLOOKUP, Using the AND, OR, and NOT Functions.												
Unit 3	DATA MANAGEMENT AND ANALYSIS								9 hours			
Data Sorting and Filtering: Sorting Data (Ascending, Descending, Custom), Applying Filters and Creating Filtered Views, Data Validation and Conditional Formatting: Setting Up Data Validation Rules, Using Conditional Formatting for Data Highlights, Working with Tables: Creating and Formatting Tables, Table Features (Total Row, Slicers, Structured References).												
Unit 4	ADVANCED FORMULAS AND DATA ANALYSIS TOOLS								9 hours			
Advanced Functions: TEXT Functions (LEFT, RIGHT, MID, CONCATENATE), DATE Functions (TODAY, NOW, DATE, DATEDIF), Array Formulas, PivotTables and Pivot Charts: Creating and Modifying PivotTables, Using Pivot Charts for Data Visualization, What-If Analysis Tools: Scenario Manager, Goal Seek, Data Tables.												
Unit 5	DATA VISUALIZATION AND REPORTING								9 hours			
Chart Creation and Customization: Creating Basic Charts (Column, Bar, Line, Pie), Customizing Charts (Titles, Labels, Colors), Advanced Chart Techniques: Combination Charts, Sparklines and Data Bars, Creating Dashboards: Designing Interactive Dashboards, Linking Data with Interactive Elements (Buttons, Drop-downs), Best Practices for Dashboard Design												
									Total Lecture Hours			45 hours
Textbooks:												
							Authors Name					
1. "Microsoft Excel Formulas and Functions (Office 2021 and Microsoft 365)", 1st Edition, Pearson, 2023							Paul McFedries					
2. "Mastering Advanced Excel", 1st Edition, BPB, 2023							Ritu Arora					
3. "Mastering Advanced Excel", 1st Edition, Penman Book, 2019							Naveen Mishra					

Reference Books:

	Authors Name
1. "200+ Excel Formulas and Functions", 1st Edition, BPB Publications, 2023	Prof. Michael McDonald
2. "Microsoft Excel Professional 2021 Guide", 1st Edition, BPB Publications, 2022	CA Manmeet Singh Mehta

Self-Study Content Links:

	Duration (in Hrs)
MOOCs	10 Hrs
Video Lectures	2hr 26min 6min 6min 12min 42min
Web References	

Course Code: DBCA0103			Course Name: C Programming			L	T	P	C
Course Offered in: BCA 1 st Year						3	0	0	3
Pre-requisite: Basic knowledge of computers.									
Course Objectives:									
The objective of a C programming course is to provide students with a solid foundation in the C programming language. The course aims to familiarize students with the syntax, concepts, and principles of C programming, as well as develop their ability to write efficient and effective C code.									
Course Outcome: After completion of the course, the student will be able to							Bloom's Knowledge Level (KL)		
CO1	Understand algorithm concepts, flowcharts, and C programming basics including syntax, data types, I/O, memory, and error handling.					K2			
CO2	Demonstrate structured C program using operators, control structures and loops to solve basic computational problems.					K3			
CO3	Apply arrays, strings, structures, unions, and pointers to develop modular C programs					K3			
CO4	Develop C programs using functions, recursion, variable scope, and dynamic memory management with library functions like malloc and free.					K5			
CO5	Apply storage classes, file handling functions and command-line arguments to manage data and modularize C programs effectively.					K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	2	1	1	3	2	1	1	2	
CO2	2	2	2	3	2	1	1	2	
CO3	2	3	2	3	2	1	1	2	
CO4	2	3	3	3	2	2	1	3	
CO5	1	2	3	2	3	2	1	3	
Course Contents / Syllabus									
Unit-1	BASIC CONCEPTS OF C PROGRAMMING							9 hours	
Overview of Excel Interface: Ribbon, Tabs, and Quick Access Toolbar, Workbook and Worksheet Navigation, Understanding Cells, Rows, and Columns, Basic Operations: Workbook and Worksheet Navigation, Creating, Saving, and Opening Workbooks, Entering and Editing Data, Using Autofill and Flash Fill, Basic Formatting: Formatting Cells (Font, Color, Alignment), Number Formatting (Currency, Date, Percentage), Adjusting Row Height and Column Width.									
Unit 2	OPERATORS, CONTROL BRANCHING, LOOPS							9 hours	
Arithmetic Expressions and Precedence: Operators and Expression Using Numeric and Relational Operators, Arithmetic Operator, Logical Operators, Bit Operations, Assignment Operator, Mixed Operands, Type Conversion. Conditional Branching: if, else-if, nested if - else, switch statements, use of break, and default with switch Iteration and loops: Concept of loops, for, while and do- while, multiple loop variables, use of break and continue statements, nested loop.									
Unit 3	ARRAYS AND POINTER							9 hours	
Arrays and Strings: Array Notation and Representation, Manipulating Array Elements, using Multi-Dimensional Arrays. Character Arrays, String and String functions. Structure and Union: Declaration of Structure and Union, Difference between Structure and Union, Enumerated Data types, Array of Structures. Pointers: Pointer's basics and Declaration, Applications, Use of Pointers in Self-Referential Structures.									
Unit 4	FUNCTIONS AND MEMORY MANAGEMENT							9 hours	
Functions: Concept of Sub-programming, Function, different types of functions, passing parameters to functions calling: call by value, Call by Reference, Recursion. Scope of variable: Local and Global variables, Memory Management: Static Memory and Dynamic Memory (Library functions– malloc, calloc, realloc and free).									
Unit 5	STORAGE CLASSES & FILE OPERATIONS AND ADVANCED APPLICATIONS							9 hours	
Storage classes: Auto, Register, Static and Extern. File Handling: Types of Files, File I/O Functions, Standard C Preprocessors, Defining and Calling Macros and Command-Line Arguments									
Total Lecture Hours							45 hours		
Textbooks:									
							Authors Name		

1. "C: The Complete Reference", McGraw Hill Education, 4 th Edition 2022		Herbert Schildt
2. "Computing Fundamentals and C Programming", , McGraw-Hill, 2 nd Edition, 2018,		E. Balagurusamy
3. "Let Us C", BPB publication, 16 th Edition, 2018		Yashavant P. Kanetkar
Reference Books:		
		Authors Name
1. Modern C, Third Edition" Manning Publications, 3 rd Edition, 2023.		Jens Gustedt
2. Head First C: A Brain-Friendly Guide, 1 st Edition, 2012		CA David and Dawn Griffiths
Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013843421957570560_38910_shared/overview	4 Hrs
Video Lectures	https://www.youtube.com/watch?v=KnbvUiSxvbM&list=PL98qAXLA6aftD9ZlnjpLhdQAOFI8xIB6e&ab_channel=Programiz https://www.youtube.com/watch?v=JYHpD9huNR4&list=PL98qAXLA6aftD9ZlnjpLhdQAOFI8xIB6e&index=25&ab_channel=Programiz https://www.youtube.com/watch?v=MOeGnamlUP4&list=PL98qAXLA6aftD9ZlnjpLhdQAOFI8xIB6e&index=19&ab_channel=Programiz https://www.youtube.com/watch?v=zmRxC7gYw-g&list=PLBlnK6fEyqRiteqwlMLXYtZ16xXDR7MO0&ab_channel=NesoAcademy https://www.youtube.com/watch?v=UxifZwj5xU&ab_channel=GateSmashers	5min 10min 13min 3min 10min
Web References	https://www.w3schools.com/c/c_intro.php https://www.geeksforgeeks.org/c/c-programming-language/	

Course Code: DBCA0104				Course Name: Design Thinking-I				L	T	P	C
Course Offered in: BCA 1 st Year								2	0	0	2
Pre-requisite: Basic communication skills, problem-solving ability, creativity, and willingness to work in teams.											
Course Objectives:											
The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.											
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)			
CO1	Develop a strong understanding of the design process and apply it in a variety of business settings.							K1			
CO2	Analyze self, culture, and teamwork to work in a multidisciplinary environment and exhibit empathetic behavior.							K3			
CO3	Formulate specific problem statements of real-time issues and generate innovative ideas using design tools.							K4			
CO4	Apply critical thinking skills to arrive at the root cause from a set of likely causes.							K4			
CO5	Demonstrate an enhanced ability to apply design thinking skills for evaluation of claims and arguments.							K4			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	2	3	2	2	2	1	2			
CO2	1	2	2	1	3	1	2	3			
CO3	2	3	3	2	2	1	1	2			
CO4	2	3	2	2	1	1	1	2			
CO5	2	3	3	2	1	1	1	3			
Course Contents / Syllabus											
Unit 1	INTRODUCTION								6 hours		
An overview of future skills, introduction to design thinking, traditional problem solving versus design thinking, history of design thinking, wicked problems. Innovation and creativity, the role of innovation and creativity in organizations, creativity in teams and their environments, design mindset. Introduction to elements and principles of design, 13 Musical Notes for Design Mindset, Examples of Great Design, Design Approaches across the world.											
Case Studies: Mumbai Dabbawallas, Gillette, Singapore, Bengaluru, Bahubali, Google, Embrace Incubator											
Activity: Observation, Wicked Problem.											
Unit 2	ETHICAL VALUES AND EMPATHY								6 hours		
Understanding humans as a combination of I (self) and body, basic physical needs up to actualization, prosperity, the gap between desires and actualization. Understanding culture in family, society, institution, startup, socialization process. Ethical behavior: effects on self, society, understanding core values and feelings, negative sentiments and how to overcome them, definite human conduct: universal human goal, developing human consciousness in values, policy, and character.											
Understanding stakeholders, techniques to empathize with, identify key user problems. Empathy tools- Interviews, empathy maps, emotional mapping, immersion and observations, Emotional Intelligence, customer journey maps, classifying insights after Observations, Classifying Stakeholders.											
Case Studies: Pure-it, Royal Enfield, Big Basket, Air-bnb											
Activity: Moccasin Walk, Persona, Empathy map, Journey Map											
Unit 3	PROBLEM STATEMENT AND IDEATION								6 hours		
Defining the problem statement, creating personas, Point of View (POV) statements. Research identifying drivers, information gathering, target groups, samples, and feedbacks. Idea Generation basic design directions, Themes of Thinking, inspirations and references, brainstorming, inclusion, sketching and presenting ideas, idea evaluation, double diamond approach, analyze – four W's, 5 why's, "How Might We", Defining the problem using Ice-Cream Sticks, Metaphor & Random Association Technique, Mind-Map, ideation activity games - six thinking hats, million-dollar idea, introduction to visual collaboration and brainstorming tools - Mural, JamBoard.											
Case Studies: The Good Kitchen, Flipkart, Uber, Redbus, Big Bazaar											
Activity: 5 Why, HMW, Brainstorming, Six Thinking Hats, 30 Circles, paper prototype											
Unit 4	CRITICAL THINKING								6 hours		
Fundamental concepts of critical thinking, the difference between critical and ordinary thinking, characteristics of critical thinkers, critical thinking skills- linking ideas, structuring arguments, recognizing incongruences, five pillars of critical thinking, argumentation versus rhetoric, cognitive bias, tribalism, and politics. Case study on applying critical thinking on different scenarios.											

Case Studies: Byju's, Maggi noodles, Tata Nano

Activity: debate, role play

Unit 5 **LOGIC AND ARGUMENTATION**

6 hours

The argument, claim, and statement, identifying premises and conclusion, truth and logic conditions, valid/invalid arguments, strong/weak arguments, deductive argument, argument diagrams, logical reasoning, scientific reasoning, logical fallacies, propositional logic, probability, and judgment, obstacles to critical thinking. Group activity/role plays on evaluating arguments.

Case Studies: Aadhaar Card, Demonetization, Odd-Even Policy, Jio

Activity: Logical Fallacy Detective, Fact-Checking Challenge

Total Lecture Hours **30 hours**

Textbooks:

	Authors Name
1. UnMukt: Science & Art of Design Thinking – First Edition, 2019 (AICTE, New Delhi)	Arun Jain
2. Solving Problems with Design Thinking– First Edition, 2013,	Jeanne Liedtka
3. A Foundation Course in Human Values and Professional Ethics, First Edition, 2010,	R. R. Gaur, R. Sangal, G. P. Bagaria

Reference Books:

	Authors Name
1. 101 Design Methods, First Edition, 2012	Vijay Kumar
2. Change by Design, Revised & Updated Edition, 2019,	Tim Brown
3. How to Improve Your Critical Thinking & Reflective Skills, First Edition, 2019	McMillan

Self-Study Content Links:

	Duration (in Hrs)
MOOCs	3hr 31 mins
Video Lectures	5 min 4 min 26 min 2 min
Web References	

Course Code: DBCA0105			Course Name: Environmental Science and Sustainability			L	T	P	C
Course Offered in: BCA 1 st Year						2	0	0	2
Pre-requisite: Basic knowledge of biology, chemistry, ecology, geology, mathematics, and understanding of human impacts on natural systems.									
Course Objectives:									
After completion of the course, the student will be able to To understand ecosystems, promote sustainability, address environmental issues, conserve biodiversity, and ensure responsible use of natural resources for future generations.									
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)	
CO1	Understand the basic principles of ecology and environment. Ecosystem: Basic concepts, components of ecosystem, food chains and food webs. Ecological pyramids, biodiversity.							K2	
CO2	Understand the different types of natural resources like food, forest, Minerals and energy and their conservation.							K2	
CO3	Understand the different types of pollution, pollutants, their sources, effects and their control methods.							K2	
CO4	Understand the basic concepts of sustainable development.							K2	
CO5	Understand Environmental Impact Assessment (EIA) and different acts related to environment.							K2	
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	3	3	2	2	1	3	3	2	
CO2	3	3	2	2	1	3	3	2	
CO3	3	3	2	2	1	3	3	3	
CO4	3	3	2	2	1	3	3	2	
CO5	3	3	2	2	1	3	3	2	
Course Contents / Syllabus									
Unit 1	BASIC PRINCIPLE OF ECOLOGY AND BIODIVERSITY							6 hours	
Definition, Scope and basic principles of ecology and environment. Ecosystem: Basic concepts, components of ecosystem. Food chains and food. Webs. Ecological pyramids, Energy flow in ecological systems, Characteristics of different ecosystems. Biogeochemical Cycles: Importance, gaseous and sedimentary cycles. Carbon, Nitrogen, Phosphorus and Sulphur Cycles. Biodiversity and their importance, Threats to biodiversity, major causes, extinction's, vulnerability of species to extinction, IUCN threat categories, Red data book. Strategies for biodiversity conservation, principles of biodiversity conservation in-situ and ex-situ conservation strategies Mega diversity zones and Hot spots, concepts, distribution and importance.									
Unit 2	NATURAL RESOURCES AND ECOLOGICAL SUCCESSION							8 hours	
Natural resources and associated problems. Forest resources: Use and over- exploitation, deforestation. Timber extraction, mining, dams and their effects on forest and tribal people. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. Food resources: World food problems, changes caused by agriculture and over- grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. Land resources: Land as a resource, land degradation, man induced landslides. Equitable use of resources for sustainable lifestyles. Non-Renewable Energy Resources: Fossil fuels and their reserves, Nuclear energy, types, uses and effects, Renewable Energy Resources: hydropower, Solar energy, geothermal, tidal and wind energy, Biomass energy, biogas and its advantages. Ecological succession-Types, stages, examples of ecological succession									
Unit 3	POLLUTION AND WASTE MANAGEMENT							8 hours	
Air pollution: sources of air pollution, Primary and secondary air pollutants. Origin and effects of SOX, NOX, CO, CFC, Hydrocarbon, control of air pollution. Water pollution: sources and types of water pollution, Effects of water pollution, Eutrophication, Soil pollution: Causes of soil pollution, Effects of soil pollution, Major sources of and effects of noise pollution on health, Radioactive and thermal pollution sources and their effects on surrounding environment. Solid waste disposal and its effects on surrounding environment, Introduction to E- Waste, Types and classification of E- Waste, Impacts of E- Waste on environment and human health, E-Waste management and recycling., Climate change, global warming, acid rain, ozone layer depletion.									
Unit 4	ENVIRONMENTAL ASSESSMENT, LEGISLATION AND SUSTAINABILITY							8 hours	
Women education, Role of NGOs regarding environmental protection, Bio indicators and their role, Natural disasters and disasters									

management, Aims and objectives of Environmental Impact Assessment (EIA). Salient features of following Acts: Environmental Protection Act, 1986, Wildlife (Protection) Act, 1972. Water (Prevention and control of pollution) Act, 1974. Forest (Conserving) Act, 1980.

Definition and concept of sustainability, impacted areas of sustainable development, Global initiative and issues on sustainable development UNSDsGs, System Thinking and Sustainability.

Total Lecture Hours **30 hours**

Textbooks:

	Authors Name
1. The Nature and Properties of Soils (Tenth Edition), 1990	Nyle C. Brady
2. Fundamentals of Environmental Chemistry, 3 rd Edition, 2009	Gurdeep Singh Sodhi
3. Fundamentals of Ecology, 5 th Edition, 2005	Madhab Chandra Dash

Reference Books:

	Authors Name
1. Air Pollution, 2 nd Edition, 2001	M. N. Rao and H. V. N. Rao
2. A Text Book of Environmental Science, 6 th Edition, 2018	Shashi Chawla

Self-Study Content Links:

		Duration (in Hrs)
MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_0138628249712066564/overview	46 hrs
Video Lectures	https://www.youtube.com/watch?v=T21OO0sBBfc , https://www.youtube.com/watch?v=NuQE5fKmfME https://www.youtube.com/watch?v=yEci6iDkXYw https://www.youtube.com/watch?v=y2JGoKEZTqk	7min 13min 5min 17min
Web References	https://onlinelibrary.wiley.com/journal/10991719	

Course Code: DBCA0106			Course Name: Introduction to Matrices and Calculus					L	T	P	C
Course Offered in: BCA 1 st Year								3	0	0	3
Pre-requisite: Knowledge of Mathematics up to 10th standard.											
Course Objectives:											
The objective of this course is to introduce students to the fundamental concepts of matrices and their applications in solving mathematical problems and systems of equations. It also aims to develop an understanding of differential and integral calculus, enabling students to analyze rates of change, optimize functions, and solve real-world engineering and scientific problems using mathematical techniques.											
Course Outcome: After completion of the course, the student will be able to								Bloom’s Knowledge Level (KL)			
CO1	Apply the concept of matrix and determinants to find the solution of system of linear equation							K3			
CO2	Apply the concept of sets relations and functions to solve problems based on sets and functions							K3			
CO3	Apply the concept of limit and continuity and differentiation for various functions.							K3			
CO4	Apply the concept of Integration.							K3			
CO5	Solve the problems of Profit, Loss, Number & Series, Coding & decoding.							K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	2	2	1	1	-	-	1			
CO2	3	1	1	-	-	-	-	1			
CO3	3	2	1	-	-	-	-	-			
CO4	3	2	2	-	-	-	-	1			
CO5	3	2	2	-	-	-	-	1			
Course Contents / Syllabus											
Unit-1	MATRIX AND DETERMINANTS								9 hours		
Introduction to Artificial Intelligence, History of AI, Applications of AI, Intelligent Agents, Types of Intelligent Agents, Domains of AI: Machine Learning, Deep Learning, Natural Language Processing, Computer Vision, Generative AI, Applications of AI, AI Control Tower.											
Unit-2	SETS, RELATIONS AND FUNCTIONS								9 hours		
Importance of Data, Information, Knowledge, Wisdom, Types of Data [Structured and Unstructured], Data Collection, Data Processing, Data Analysis – Descriptive and Inferential.											
Unit-3	LIMITS, CONTINUITY, DIFFERENTIATION								9 hours		
Concept and importance of Prompt Engineering, Types of prompts: zero-shot, few-shot, chain-of-thought, Principles of effective prompt creation.											
Introduction to Microsoft Copilot and Google Gemini in Docs and Sheets, AI features in MS Word: content suggestions, grammar checks, summarization, AI features in MS Excel: smart fill, charts, formula predictions.											
Unit-4	INTEGRATION								9 hours		
Introduction to AI Ethics, Need for Responsible AI, Ethical Use of AI Tools, AI Content Generation, Biases in AI, Types of Bias in AI, Bias Mitigation, Privacy and Data Protection, Transparency in AI, AI Rules and Regulations, Accountability in AI Systems.											
Unit-5	APTITUDE-I								9 hours		
Simplification, Percentage, Profit, loss & discount, Average, Number& Series, Coding & decoding, Time and Work.											
									Total Lecture Hours	45 hours	
Textbooks:											
						Authors Name					
1. BCA Mathematics Volume -1&2, Latest Edition, 2023						Krishna Publications					
2. NCERT, “Mathematics Part I - Textbook for Class XII, Latest Edition, 2024						NCERT					
3. NCERT, “Mathematics Part II - Textbook for Class XII, Latest Edition, 2024						NCERT					
Reference Books:											
						Authors Name					
1. Elementary Engineering Mathematics, 7th Edition, 2013						B.S. Grewal					
2. Differential Equations, 3rd Edition, 1984						G.F. Simmons					
3. Quantitative Aptitude” NCERT, “Mathematics - Textbook for Class XI, Revised Edition, 2025						R.S. Aggarwal					

Self-Study Content Links:		Duration (in Hrs)
MOOCs	1. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01384334443142348836579_shared/overview	05 Hrs
Video Lectures	1. https://youtu.be/VRZWYI24ggU?si=LcQdsV7i2ZyhaYqf 2. https://www.youtube.com/watch?v=4sTWVBmY0Xc&list=PLbMVo5nJSxFihV-ec4A3z_FOGPRCo-&index=5&pp=iAQB https://youtu.be/E6BJWGYHEOA?si=Dt9pFLHqR3Qj4idk 3. https://www.youtube.com/watch?v=ovKqObcXJ4Y&list=PLzJaFd3A7DZuyLLbmVpb9e9VLF3Q9_cYBL&index=15&pp=iAQB https://www.youtube.com/watch?v=cvA9rLsOb90&list=PLLtQdEJkug7uNcEFgM6fbbT1IUcT_3tPNk&index=1&pp=iAQB	00 Hrs 08 Min 00 Hrs 09 Min 00 Hrs 10 Min 00 Hrs 10 Mins 00 Hrs 10 Mins
Web References	https://en.khanacademy.org/math/algebra-home/alg-matrices/v/introduction-to-the-matrix?utm_source=chatgpt.com https://ocw.mit.edu/courses/18-01sc-single-variable-calculus-fall-2010/?utm_source=chatgpt.com	

LAB Course Code: DBCA0152			LAB Course Name: Basics of Data Analytics using Spreadsheet Lab					L	T	P	C
Course Offered in: BCA 1 st Year								0	0	2	1
Pre-requisite: Basic knowledge of computer system											
Course Objectives:											
The objective of this course is to supervise students with a comprehensive understanding of Microsoft Excel from basic operations to advanced data analysis and visualization techniques.											
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)			
CO1	Apply operation of Excel's interface, data entry and formatting to create and manage spreadsheets effectively.							K3			
CO2	Apply essential formulas and functions to perform calculations and data analysis efficiently.							K4			
CO3	Develop skills in sorting, filtering and using tables to organize and analyze large datasets.							K5			
CO4	Apply advanced functions, Pivot tables, and what-if analysis tools to enhance data insights and decision-making.							K4			
CO5	Create and customize charts and dashboards to visualize data and present information clearly and effectively.							K5			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	2	1	3	2	1	1	2			
CO2	3	3	2	3	1	1	1	2			
CO3	3	3	2	3	2	1	1	2			
CO4	3	3	3	3	2	1	1	3			
CO5	3	2	2	3	3	2	1	3			
List Of Practicals											
S. No.	Name of Experiments/ Programs								CO		
1	Create a new workbook and save it as "Budget.xlsx".								CO1		
2	Enter data into cells A1 to D5 with headers "Item", "Quantity", "Price", and "Total".								CO1		
3	Use AutoFill to fill the months of January to December in a row.								CO1		
4	Change the font of the headers to bold and size 14.								CO1		
5	Format cells B2 to B5 to display currency.								CO1		
6	Adjust the width of column A to fit the content.								CO1		
7	Apply a border around the range A1.								CO1		
8	Merge and center the title "Monthly Budget" across columns A to D.								CO1		
9	Apply a background color to the header row (A1).								CO1		
10	Insert a new worksheet and rename it "Summary".								CO1		
General Formulas in Excel											
11	Write a formula in cell D2 to calculate the total price (Quantity * Price).								CO2		
12	Copy the formula in D2 down to D5 using AutoFill.								CO2		
13	Use the SUM function to calculate the total expenditure in cell D6								CO2		
14	In cell E2, use an IF function to check if the total is greater than 100, returning "Yes" or "No".								CO2		
15	Apply the AVERAGE function to find the average price in column C.								CO2		
16	Use the MIN function to find the minimum quantity in column B.								CO2		
17	Write a formula in F2 to look up the price of an item using VLOOKUP.								CO2		

18	Use the COUNT function to count the number of items in column A.	CO2
19	Create a formula in G2 to concatenate the item name and quantity.	CO2
20	Write a formula using the AND function to check if both conditions are met in cell H2.	CO2
Data Analysis		
21	Sort the data in the range A2 by the Item name alphabetically.	CO3
22	Apply a filter to the data in the range A1.	CO3
23	Use a filter to display only items with a price greater than 50.	CO3
24	Apply conditional formatting to highlight cells in column D that are greater than 200.	CO3
25	Set up data validation in cell E2 to allow only whole numbers between 1 and 100.	CO3
26	Create a table from the range A1 and apply a table style.	CO3
27	Add a total row to the table to sum the values in the "Total" column.	CO3
28	Insert a slicer for the "Item" column in the table.	CO3
29	Use structured references to sum the total prices in the table.	CO3
30	Remove duplicates from a list of items in column A.	CO3
Pivot tables and specific formulas in MS Excel		
31	Create a Pivot Table from the data in the range A1.	CO4
32	Add "Item" to the Rows area and "Total" to the Values area in the PivotTable.	CO4
33	Create a PivotChart based on the PivotTable.	CO4
34	Use the TEXT function to format a date in cell B2 as "Month Day, Year".	CO4
35	Write an array formula to multiply the quantities and prices in columns B and C.	CO4
36	Use the DATE function to create a date from year, month, and day in separate cells.	CO4
37	Implement the Goal Seek tool to find the necessary quantity to reach a total of 500.	CO4
38	Set up a Scenario Manager to compare different budget scenarios.	CO4
39	Create a data table to show the effect of varying prices on total expenditure.	CO4
40	Use the INDEX and MATCH functions to retrieve data from a table.	CO4
Charts creation in Excel		
41	Create a column chart from the data in the range A1.	CO5
42	Add a title to the chart "Monthly Expenditure".	CO5
43	Customize the chart colors to match a specific theme.	CO5
44	Add data labels to the chart.	CO5
45	Create a pie chart to show the distribution of total expenditure by item.	CO5
46	Use sparklines to show trends in monthly sales data.	CO5
47	Insert a bar chart and change the axis titles.	CO5
48	Create a combination chart with both line and column series.	CO5
49	Design an interactive dashboard using slicers and Pivot Charts.	CO5
50	Link a chart to a different worksheet for a consolidated view.	CO5
51	Apply a custom chart template to a new chart.	CO5
52	Add a secondary axis to a chart to display dual metrics.	CO5
53	Format a chart with gradients and 3D effects.	CO5

54	Create a waterfall chart to show changes in values over time.	CO5
55	Insert a bubble chart to display data with three dimensions.	CO5
56	Use a gauge chart to represent a KPI (Key Performance Indicator).	CO5
57	Develop a sales dashboard with interactive elements.	CO5
58	Add a timeline slicer to a Pivot Table.	CO5
59	Create a heat map using conditional formatting to highlight data ranges.	CO5
60	Publish a dashboard to Power BI for broader sharing and collaboration.	CO5
Total Lecture Hours		15 hours

Course Code: DBCA0153		Course Name: C Programming Lab				L	T	P	C
Course Offered in: BCA 1 st Year						0	0	2	2
Pre-requisite: Basic knowledge of computer system									
Course Objectives:									
The objective of a C programming course is to provide students with a solid foundation in the C programming language. The course aims to familiarize students with the syntax, concepts, and principles of C programming, as well as develop their ability to write efficient and effective C code.									
Course Outcome: After completion of the course, the student will be able to						Bloom's Knowledge Level (KL)			
CO1	Implement and trace the execution of conditional and iteration programs.					K3			
CO2	Implement Pointers, Functions, Recursion and Memory allocation concepts.					K3			
CO3	Acquire the knowledge of memory allocation and binding, array, structure to solve complex problems					K3			
CO4	Compare and contrast between Structure and union along with concepts of DMA					K4			
CO5	Understand and apply the concepts of File Handling and Embedded Programming					K3			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	3	2	2	2	1	-	-	1	
CO2	3	3	3	2	1	-	-	2	
CO3	3	3	3	2	1	-	-	2	
CO4	3	2	2	2	1	-	1	1	
CO5	3	2	2	3	2	2	2	3	
List of Practical's (Indicative & Not Limited To)									
1	WAP that accepts the marks of 5 subjects and finds the sum and percentage marks obtained by the student.								CO1
2	WAP that calculates the Simple Interest and Compound Interest. The Principal, Amount, Rate of Interest and Time are entered through the keyboard.								CO1
3	WAP to calculate the area and circumference of a circle.								CO1
4	WAP to Calculate the Sum of Natural Numbers.								CO1
5	WAP to Find the Roots of a Quadratic Equation.								CO1
6	WAP that accepts the temperature in Centigrade and converts into Fahrenheit using the formula $C/5=(F-32)/9$.								CO1
7	WAP to design a Calculator which performs Number system conversion								CO1
8	WAP that swaps values of two variables using a third variable.								CO1
9	WAP that swaps values of two variables without using a third variable.								CO1
10	WAP that checks whether the two numbers entered by the user are equal or not.								CO1
11	WAP to find the greatest of three numbers.								CO1
12	WAP that finds whether a given number is even or odd.								CO1
13	WAP that tells whether a given year is a leap year or not.								CO1
14	WAP to Calculate Pow (x,n)								CO1
15	WAP that accepts marks of five subjects and finds percentage and prints grades according to the following criteria: Between 90-100% Print 'A' 80-90% -----Print 'B' 60-80%-----Print 'C' Below 60% Print 'D'								CO2

16	WAP that takes two operands and one operator from the user, perform the operation, and prints the result by using Switch statement.	C02
17	WAP to print the sum of all numbers up to a given number.	C02
18	WAP to find the factorial of a given number.	C02
19	WAP to print sum of even and odd numbers from 1 to N numbers.	C02
20	WAP to print the Fibonacci series.	C02
21	WAP to print half pyramid of *	C02
22	WAP to print half pyramid of alphabet	C02
23	WAP to print Full pyramid of *	C02
24	WAP to print full pyramid of numbers	C02
25	WAP to print full pyramid of alphabet	C02
26	WAP to print Inverted full pyramid of *	C02
26	WAP to print Pascal's triangle	C03
27	WAP to check whether the entered number is prime or not.	C03
28	C Program to Check Whether a Character is Vowel or Consonant	C03
29	WAP to find the sum of digits of the entered number.	C03
30	WAP to find the reverse of a number.	C03
31	WAP to print Armstrong numbers from 1 to 100.	C03
32	WAP to convert binary number into decimal number and vice versa.	C03
33	WAP that simply takes elements of the array from the user and finds the sum of these elements.	C03
34	WAP that inputs two arrays and saves sum of corresponding elements of these arrays in a third array and prints them.	C03
35	WAP to find the duplicate value in an array.	C03
36	WAP to Find the Maximum and Minimum in an Array	C03
37	WAP to Find Sum of Series $1^2 + 2^2 + \dots + n^2$	C03
38	WAP to Find LCM of Two Numbers	C03
39	WAP to Display Factors of a Number	C03
40	WAP to Find GCD of two Numbers	C03
41	WAP to find the duplicate value in an array.	C04
42	WAP to Find the Maximum and Minimum in an Array	C04
43	WAP to Find Sum of Series $1^2 + 2^2 + \dots + n^2$	C04
44	WAP to Find LCM of Two Numbers	C04
45	WAP to Display Factors of a Number	C04
46	Declare and initialize a structure to store and display student details (name, age, marks).	C04
47	Define a structure data type TRAIN_INFO. The type contains Train No.: integer type Train name: string Departure Time: aggregate type TIME Arrival Time: aggregate type TIME Start station: string End station: string The structure type Time contains two integer members: hour and minute. Maintain a train timetable and implement the following operations: a. List all the trains (sorted according to train number) that depart from a particular section. b. List all the trains that depart from a particular station at a particular time. c. List all the trains that depart from a particular station within the next one hour of a given time. List all the trains between a pair of start station and end station.	C05
48	WAP to swap two elements using the concept of pointers.	C05
49	WAP to compare the contents of two files and determine whether they are same or not.	C05
50	WAP to check whether a given word exists in a file or not. If yes then find the number of times it occurs.	C05
51	WAP to allocating memory for an array of integers.	C05
52	WAP allocating memory for an array of integers using malloc().	C05

53	WAP allocating memory for an array of integers using calloc().	CO5
	Total Lecture Hours	30 hours

Course Code: DBCA0158		Course Name: Workplace communication Lab 1					L	T	P	C
Course Offered in: BCA 1 st Year							0	0	4	2
Pre-requisite: Comprehension of basic English language										
Course Objectives:										
To improve proficiency in the English language to the Intermediate level of CEFR (Common European Framework of Languages).										
Course Outcome: After completion of the course, the student will be able to							Bloom's Knowledge Level (KL)			
CO1	Identify key concepts of life-skills.						K2			
CO2	Apply effective listening skills.						K3			
CO3	Demonstrate fluency and spontaneity while speaking.						K3			
CO4	Understand and analyze simple written texts.						K4			
CO5	Compose clear and concise texts on a wide range of subjects.						K6			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1	-	1	-	-	2	-	-	3		
CO2	-	-	-	-	3	-	-	2		
CO3	-	1	-	-	3	-	-	2		
CO4	-	2	-	-	3	-	-	2		
CO5	-	1	-	-	3	-	-	2		

List Of Practical's (Indicative & Not Limited To)		CO
1	Introduction to the course and the evaluation scheme Students will gain knowledge about Examination Pattern.	CO1
2	Importance of Communication Skills and motivation to improve Students will watch Video Clips of famous personalities who have learnt to communicate well e.g., Kapil Dev, Jahnvi Panwar, APJ Abdul Kalam, and others.	CO1
3	Anubhav Activity Students will share their expectations from the course.	CO3
4	Showcasing the talents Participants will gain confidence in expressing themselves through song/dance, overcome inhibitions, and develop a sense of freedom and creativity.	CO3
5	Developing active listening and accurate communication skills Participants will enhance their listening skills, practice conveying information accurately, and understand the importance of clear communication and active listening.	CO2
6	Language Toolbox: Vocabulary enrichment Participants will be exposed to General Service List (GSL) by West and Academic Word List (AWL); the students will be asked to keep a journal of new words learnt every day.	CO5
7	Introducing others and oneself Participants will improve their speaking skills and develop clarity in listening and retaining information.	CO3
8	Think-Pair-Share for Reading Comprehension Students will actively interact with the reading material by engaging in this activity, collaborating with their peers, and refining their comprehension skills.	CO4

9	Basics of Writing The students will practice basic writing skills through sentence construction by understanding the requisites of a good sentence.	CO5
10	Listen and write The students will practice writing exactly what they hear.	CO2
11	Reading aloud The students will improve their reading ability and vocabulary. Students will read Economic Times, Readers Digest, Fiction, National Geographic, Technology magazines etc.	CO3
12	Art of Listening Participants will listen to their peers reading aloud and write down the gist; and will repeat verbatim what is read.	CO2
13	Language Toolbox 2: Word association & word formation The students will be able to improve their language proficiency.	CO5
14	Writing through prompts The students will practice writing skills through visual or verbal prompts.	CO5
15	Listening to directions and instructions Participants will improve their listening comprehension and enhance their ability to follow instructions & directions.	CO2
16	Analysing Caselets The students will improve their analytical and speaking skills by analysing & providing solutions to the issues in the caselets.	CO4
17	Decoding infographics Participants will improve their ability to interpret and analyse information presented in diagrams, graphs, and pie charts.	CO4
18	Language Toolbox 3: Vocabulary Building – Homophones, homonyms, synonyms, antonyms, phrases & idioms The students will be able to bring in variety in the usage of words.	CO5
19	Filling forms Participants will improve their ability to understand and follow instructions and develop ability in filling out forms accurately.	CO5
20	Writing Captions and Identifying Topic Sentences The students will be provided with paragraphs on a variety of topics to develop their concise & precise writing skills.	CO5
21	Sharing your views in a group discussion Participants will enhance their ability to express their opinions, actively listen to others, and engage in constructive discussions to develop well-rounded perspectives.	CO3
22	Language Toolbox 4: Vocabulary Enrichment – Abbreviations and Acronyms The exercises and activities will enhance language proficiency of the students by helping them bring in variety in their usage of words.	CO5
23	Basics of Email Writing Students will be able to write letters/applications on familiar topics and will gain knowledge to apply in real life scenarios.	CO5
24	Situation-based Role Play The students will write and present role plays to practice effective communication strategies, develop empathy and understanding, and improve their writing skills and ability to handle real-life situations through role-playing exercises.	CO3
25	Language Toolbox 5: Developing concise and clear communication The students will be able to remove verbosity from their language.	CO5
26	Project Presentations The students will be presenting their Projects	CO3
	Required Software and Tools British Council English Score Mobile App	
Total Lecture Hours		30 Hours
Textbook:		Authors:
1. ABC Workbook, Latest Edition, 2024		NIET Publishing House, Meerut, 2023
Reference Books:		Authors:
1. Cambridge English Business Benchmark (Pre-intermediate to Intermediate), 2nd edition, 2013		Norman Whitby, Cambridge University Press, 2013, UK.

Unit 5	NUTRITION, WELLNESS AND WEIGHT MANAGEMENT	6 hours
Concept, Components, Types of wellness: psychological, social, emotional, and spiritual, Significance with reference to Positive Lifestyle 2.2, Concepts of Quality of Life and Body Image Factors affecting Wellness, Wellness Programs. Concept of Nutrients, Nutrition, Balanced Diet, Dietary Aids and Gimmicks, Energy and Activity- Calorie Intake, Energy Balance Equation, Obesity - Concept, Causes, Obesity Related Health Problems, Weight Management through Behavioral Modifications.		
Total Lecture Hours		30 hours
Textbook:	Author:	
1. The Complete Book of Yoga: Karma Yoga, Bhakti Yoga, Raja Yoga, Jnana Yoga, 1 st Edition, 2007	Swami Vivekananda	
Reference Books:	Thomson Wadsworth, California, USA. Hoeger, W W K and S.A. Hoeger	
1. Principles and Labs for Fitness and Wellness, 15 th Edition, 2018		
2. Fitness and Wellness. 7th Ed. 2007	Thomson Wadsworth, Boston, USA. Hoeger, W.W. & S. Hoeger	
Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01414744943129395236/overview	02 Hrs 00 Mins
Video Lectures	https://onlinecourses.swayam2.ac.in/aic19_ed29/preview	00 Hrs 20 Mins
Web References	https://www.yogajournal.com/	

Course Code: DBCA0201				Course Name: Business Intelligence & Analytics				L	T	P	C
Course Offered in: BCA 1 st Year								3	0	0	3
Pre-requisite: Basic understanding of computers and familiarity with Microsoft Excel											
Course Objectives:											
Understand the basics of Business Analytics and how to track website data.											
Course Outcome: After completion of the course, the student will be able to									Bloom's Knowledge Level (KL)		
CO1	Apply advance formulas and functions to perform calculations and data analysis.								K3		
CO2	Demonstrate advanced Excel skills which include data manipulation, analysis and visualization using formulas, functions and pivot tables.								K3		
CO3	Create Power BI reports using various data sources, visualizations, interactions, and publish multi-page dashboards.								K5		
CO4	Design interactive dashboard present reports and report visualization for effectively communicate insights and recommendations.								K5		
CO5	Analyze setup and track website which include creating and managing goals tracking events and analyzing audience behavior.								K4		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	2	2	3	-	-	-	2			
CO2	3	3	2	3	2	-	-	2			
CO3	3	3	3	3	2	2	-	2			
CO4	2	3	3	3	2	2	-	3			
CO5	2	3	2	3	-	2	1	3			
Course Contents / Syllabus											
Unit-1	ADVANCED EXCEL SKILLS								9 hours		
Creating a Formula, Formula Auditing, Meaning and Advantages of functions, Insert function. SUM, AUTOSUM, SUMIF, SUBTOTAL PRODUCT, POWER, SQRT, ROUND. Statistical Functions: AVERAGE, AVERAGEIF and AVERAGEIFS, COUNT, COUNTA, COUNTIF, COUNTIFS, MAX MIN, MEDIAN, MODE.DATE, NOW, DAY, YEAR, MONTH, TIME, TODAY, WEEKDAY, DATEVALUE.VLOOKUP & HLOOKUP Financial Functions: Rate, Type, PV, FV, NPV, PMT, IPMT, CUMIPMT, NPV, IRR. Defining Names, Using and Managing Defined Names.											
Unit-2	DATA ANALYSIS WITH EXCEL								9 hours		
Creating a PivotTable, Specifying PivotTable Data, Filtering and Sorting a PivotTable, working with Pivot Table Layout, Grouping PivotTable Items, updating a PivotTable, formatting a PivotTable using Slicers to manipulate PivotTables, Creating a PivotChart. What if Analysis: Scenario manager, Goal seek, Data table. Import external data: From Access, From Web, From text, from SQL Server, From SQL Query. Macros: View Macros, Record Macros, Use relative Reference.											
Unit 3	INTRODUCTION TO POWER BI AND CREATING POWER BI REPORTS, AUTO FILTERS								9 hours		
Overview of Power BI, creating a new Power BI dashboard, connecting to data sources in Power BI, Understanding the different types of visualizations in Power BI Creating Power BI Reports. Report Design with Legacy & .DAT Files, Report Design with Database Tables, Understanding Power BI Report Designer, Report Canvas. Creation, Renames, Report Visuals, Fields and UI Option, Experimenting Visual Interactions, Advantages, Reports with Multiple Pages and Advantages, Pages with Multiple Visualizations. Data Access, PUBLISH Options and Report Verification in Cloud.											
Unit 4	CREATING INTERACTIVE DASHBOARDS IN POWER BI AND REPORT VISUALIZATIONS AND PROPERTIES								9 hours		
Creating tables and charts in Power BI, creating maps and geolocation visualizations in Power BI, Creating interactive dashboards with slicers and filters. Report Visualizations and Properties: Power BI Design: Canvas, Visualizations and Fields, Import Data Options with Power BI Model, Advantages, Direct Query Options and Real-time (LIVE) Data Access, Data Fields and Filters with Visualizations, Visualization Filters, Page Filters, Report Filters, Conditional Filters and Clearing. Testing Sets, Creating Customized Tables with Power BI Editor, General Properties, Sizing, Dimensions, and Positions, Alternate Text and Tiles. Header (Column, Row) Properties, Grid Properties (Vertical, Horizontal) and Styles, Table Styles & Alternate Row Colors - Static, Dynamic, Sparse, Flashy Rows, Condensed Table Reports Focus Mode, Totals Computations, Background. Borders.											
Unit 5	INTRODUCTION TO GOOGLE ANALYTICS, REPORTS AND CUSTOM DASHBOARDS								9 hours		

Overview of Google Analytics, setting up and configuring Google Analytics for a website, Understanding the Google Analytics interface, tracking website data with Google Analytics, Different types of reports in Google Analytics, Audience report to analyze website traffic, Acquisition report to analyze website traffic sources, Behavior report to analyze website behavior, Create custom dashboards in Google Analytics, custom reports in Google Analytics, filters and segments in Google Analytics.

Total Lecture Hours | **45 hours**

Textbooks:

	Authors Name
1. "Excel Data Analysis", "Kindle Publication", "20 February 2022".	Joe Webinar
2. Mastering Microsoft Power BI", "Packet Publishing", "2nd Edition," June 30 2022".	Gerg Deckler and Brett Powell

Reference Books:

	Authors Name
1. Web Analytic An Hour a Day, Sybex publication", "1st edition 2007".	Avinash Kaushik
2 "Power BI 2019", "2nd Edition" October 4, 2019",	Roger F. Silva

Self-Study Content Links:

		Duration (in Hrs)
MOOCs	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_cs64	05 Hrs
Video Lectures	https://www.youtube.com/watch?v=8Ob8Hre_SnI https://www.youtube.com/watch?v=OOWAk2aLEfk https://www.youtube.com/watch?v=cN8AO3_vmlY https://www.youtube.com/watch?v=KfxyzDjPz_4 https://www.youtube.com/watch?v=nW7iSgmSaQ8	7 min 10 min 8 min 10 min 10min
Web References	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_cs64	

Course Code: DBCA0202				Course Name: Data Structures				L	T	P	C
Course Offered in: BCA 1st Year								3	0	0	3
Pre-requisite: Knowledge of programming languages, basics of mathematics, organizing and problem-solving ability											
Course Objectives:											
Learn the basic concepts of algorithm analysis, along with implementation of linear and non- linear data structures											
Course Outcome: After completion of the course, the student will be able to									Bloom's Knowledge Level (KL)		
CO1	Describe the need of data structure and algorithms in problem solving and Analyse Time space trade-off.								K4		
CO2	Describe the real-world applications using stack and queue.								K2		
CO3	Discuss different Linked list operations.								K2		
CO4	Evaluate the real-world applications using non-linear data structures.								K4		
CO5	Identify and analyse the computational efficiencies of searching and sorting algorithms in real world problems								K5		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	3	3	2	2	1	1	3			
CO2	3	3	3	3	2	2	1	3			
CO3	3	2	3	3	2	1	1	3			
CO4	3	3	3	3	2	2	1	3			
CO5	3	3	3	3	2	2	1	3			
Course Contents / Syllabus											
Unit 1	INTRODUCTION TO DATA STRUCTURE								9 hours		
Types of Data Structures- Linear & Non-Linear Data Structures, List, Tuple, Set, Dictionary. Arrays: Derivation of Index Formulae For 1-D,2-D,3-D and n-D Array Time and Space Complexity of an algorithm, Asymptotic notations (Big Oh, Big Theta and Big Omega).											
Unit 2	STACKS & QUEUES								9 hours		
Primitive Stack operations: Push & Pop, mutual conversion of Infix, Prefix, Postfix, Evaluation of postfix expression Principles of recursion, Types of Recursions, Problem solving using iteration, Tower of Hanoi, Trade-offs between iteration and recursion. Operations on Queue: Create, Insert, Delete, Full and Empty, Circular queues, Dequeue and Priority Queue.											
Unit 3	LINKED LISTS								9 hours		
Linked lists: Comparison of Array, List and Linked list Types of linked list: Singly Linked List, Doubly Linked List, Circular Linked List, Polynomial Representation and Addition of Polynomials.											
Unit 4	TREES								9 hours		
Trees: Basic terminology, Binary Trees, Binary Tree Representation, Binary Search Tree, Strictly Binary Tree, Complete Binary Tree, Extended Binary Tree, Tree Traversal algorithms: In-order, Pre-order and Post-order. Constructing Binary Tree from given Tree Traversal, Binary Heaps, Heap Operations, Threaded Binary trees, Traversing Threaded Binary trees, AVL Tree, B-Tree.											
Unit 5	GRAPHS								9 hours		
Graphs: Terminology used with Graph, Graph Sorting Techniques: Representations: Adjacency matrices, Adjacency List. Connected Component, Spanning Trees, Prim's and Kruskal's algorithm, Shortest Path algorithms: Dijkstra Algorithm, Floyd Warshall's Algorithm. Sorting Algorithms, Hashing: Hash Functions, Collision Resolution Techniques.											
Total Lecture Hours									45 hours		
Textbooks:											
							Authors Name				
1. "Data Structures and Algorithms in Python (An Indian Adaptation)", 1 st Edition, 2017							Wiley Publication, Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser,				
2. "Problem Solving in Data Structures & Algorithms Using Python" 1 st Edition, 2022.							Hemant Jain				
Reference Books:											

		Authors Name
1. Data Structures with Python: Get familiar with the common, 1 st Edition, 2022		Dr. Harsh Bhasin
2. " Data Structures and Algorithms in Python", 1 May 2023, BPB Publication, 1 st Edition, 2023		Dr. Harsh Bhasin
Self-Study Content Links:		Duration (in Hrs)
MOOCs	https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01458327301921996831664/overview	05 Hrs
Video Lectures	https://nptel.ac.in/courses/106/106/106106127/	10 min
	https://nptel.ac.in/courses/106/106/106106127/	10 min
	https://www.youtube.com/watch?v=4OxBvBXon5w&list=PLBF3763AF2E1C572F&index=22	8 min
	https://www.youtube.com/watch?v=9zpSs845wf8&list=PLBF3763AF2E1C572F&index=24	7 min
	https://www.youtube.com/watch?v=hk5rQs7TQ7E&list=PLBF3763AF2E1C572F&index=25	5min
Web References	https://www.geeksforgeeks.org/dsa/data-structure-meaning/ https://www.w3schools.com/dsa/dsa_intro.php	

Course Code: DBCA0203			Course Name: Introduction to Networks				L	T	P	C
Course Offered in: BCA 1st Year							3	0	0	3
Pre-requisite: Basic knowledge of computer systems, operating systems, and fundamental concepts of digital communication.										
Course Objectives:										
Understand the fundamental concepts, architecture, and evolution of computer networks										
Course Outcome: After completion of the course, the student will be able to								Bloom's Knowledge Level (KL)		
CO1	Understand fundamentals of computer networks, components, performance metrics, multiplexing, topologies, and compare OSI and TCP/IP models with layer-wise responsibilities.							K2		
CO2	Analyze data link layer mechanisms, MAC protocols, switching, VLANs, trunking, DTP, VTP, and STP operation for loop prevention and port state transitions.							K4		
CO3	Model IPv4 and IPv6 networks, addressing schemes and configure routing protocols, while evaluating routing metrics, administrative distance, and loop prevention mechanisms.							K4		
CO4	Analyze TCP and UDP behavior, congestion control, traffic shaping, and their impact on QoS, including connection management, flow control, and port usage.							K4		
CO5	Apply application-layer and security solutions using core network services, NAT/PAT, cryptography, firewalls, ACLs, and threat mitigation techniques.							K3		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)										
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8		
CO1	2	2	1	1	2	1	-	1		
CO2	2	3	2	2	3	1	-	2		
CO3	3	3	3	2	3	2	-	2		
CO4	3	3	2	3	2	2	1	2		
CO5	3	3	3	2	1	3	3	2		
Course Contents / Syllabus										
Unit 1	DIGITAL SYSTEM AND BINARY NUMBERS								9 hours	
Introduction to computer networks: definition, evolution, goals, advantages, disadvantages. Network models: client-server and peer-to-peer, modes of communication. Types of networks: PAN, LAN, MAN, WAN. Network components: end devices, intermediary devices, NICs. Network media: wired and wireless media. Performance metrics: bandwidth, latency, throughput, jitter. Multiplexing techniques: FDM, TDM. Network representations: bus, ring, star, mesh, hybrid topologies, Physical vs logical topology. Network communication models: OSI and TCP/IP, layer responsibilities, comparison, and PDU at each layer.										
Unit 2	COMBINATIONAL LOGIC								9 hours	
Data link layer functions: framing, error detection and correction. Flow control: elementary data link protocols and sliding window protocols. MAC and LAN concepts: channel allocation, ALOHA, slotted ALOHA, CSMA/CD, CSMA/CA, binary-backoff algorithm. LAN standards and frame formats. Switching techniques: circuit switching, message switching, packet switching. VLAN concepts, types, and configuration, 802.1Q trunking, VLAN tagging, native VLAN, DTP and VTP, Static and dynamic VLANs. STP (IEEE 802.1D): BPDU, root bridge election, port roles, and port states. Wireless networking: WLAN standards, wireless security, hidden/exposed terminal problems, RTS/CTS, Bluetooth.										
Unit 3	SEQUENTIAL LOGIC AND ITS APPLICATIONS								9 hours	
Role of the network layer: logical addressing, path determination, packet encapsulation. IP addressing: need for IP address, classification of addresses. IPv4 addressing: notation, classes, public and private addresses, loopback address, IPv4 header format and ICMPv4. Subnetting and VLSM: subnet mask, CIDR, efficient network division. IPv6 addressing: need, differences from IPv4, unicast, multicast, anycast, IPv6 header format and ICMPv6.										

Routing concepts: router functions, routing metrics, routing table structure, Distance vector vs link state routing, Static routing and default route.

Dynamic routing protocols: RIPv1, RIPv2, OSPF, EIGRP, BGP, IS-IS.

Unit 4	FINITE STATE MACHINE	9 hours
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Role of transport layer: end-to-end communication, multiplexing and demultiplexing. TCP: key characteristics, packet format, flow control, error recovery, applications.

TCP handshaking: three-way handshake and four-way teardown.

UDP: characteristics, packet format, working, applications.

Port numbers: well-known, registered, and dynamic/private ports.

TCP socket: life cycle and socket programming basics.

Security and attack concepts: port scanning, banner grabbing, socket-based attacks, MITM, packet sniffing, SSL/TLS, session hijacking, Intrusion detection systems, Reverse shells, backdoors, and Netcat usage.

Secure socket coding and encryption in socket communication, DoS/DDoS attacks.

Congestion control: open-loop and closed-loop techniques.

Traffic shaping: leaky bucket and token bucket algorithms

Unit 5	INTRODUCTION TO IOT	9 hours
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Application layer protocols: DNS, DHCP, HTTP/HTTPS.

HTTP methods: GET, POST, PUT, DELETE, HTTP status codes and TLS/SSL.

FTP: Active and passive modes, SFTP, TFTP.

Email system architecture: UA, MTA, MAA.

Email protocols:

SMTP, POP3, IMAP. **Network management:**

SNMP v1, v2c, and v3.

NAT and PAT: Static NAT, dynamic NAT, PAT, and configuration.

Network threats: DoS/DDoS, reconnaissance, access attacks, MITM, social engineering, phishing.

Cryptography basics: Goals, security services, plaintext, ciphertext, key, encryption, decryption, Substitution and transposition techniques, Symmetric key cryptography: block ciphers, stream ciphers, DES, Asymmetric key cryptography: public key cryptography, RSA, Digital signatures.

Firewall concepts: Types of firewalls, packet filtering, stateful vs stateless inspection, policies and rules.

ACLs: standard, extended, named ACLs, wildcard masks, IPv6 ACLs, implicit deny, permit ICMPv6.

Total Lecture Hours	45 hours
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Textbooks:

	Authors Name
1. Data Communications and Networking, 4th Edition McGraw-Hill Education, 2007	Behrouz A. Forouzan
2. Computer Networks, 5th Edition, Pearson Education, 5 th Edition, 2011	Andrew S. Tanenbaum and David J. Wetherall

Reference Books:

	Authors Name
1. Introduction to Networks Companion Guide (CCNAV7), 1st Edition, Cisco Press / Pearson Education, 1 st Edition, 2020	Allan Johnson

Self-Study Content Links:

	Duration (in Hrs)
MOOCs	70 Hrs
Video Lectures	https://nptel.ac.in/courses/108105113
	https://www.youtube.com/watch?v=yKPD_UkbgXo&list=PLxCzCOWd7aiHMonh3G6QNKq53C6oNXGrXx
	https://www.youtube.com/watch?v=FavBqeTTmO0
	https://www.youtube.com/watch?v=p6yPvw88BJk
	https://www.youtube.com/watch?v=L7TuYeSmJ2g
	https://www.youtube.com/watch?v=kb-Ww8HaHuE
Web References	https://www.geeksforgeeks.org/digital-logic/digital-electronics-logic-design-tutorials/
	https://nptel.ac.in/courses/108105113

Course Code: DBCA0204				Course Name: Statistics for Computer Applications				L	T	P	C
Course Offered in: BCA 1 st Year								3	0	0	3
Pre-requisite: Basic Knowledge of Statistics											
Course Objectives:											
Understand the concept of Mathematical Expectations and Probability Distribution											
Course Outcome: After completion of the course, the student will be able to									Bloom's Knowledge Level (KL)		
CO1	Apply the concept of correlation, moments, skewness and kurtosis and curve fitting.								K3		
CO2	Apply the concept of probability to evaluate probability distributions.								K3		
CO3	Apply the concept of Mathematical Expectations and Probability Distribution.								K3		
CO4	Apply the concept of hypothesis testing and statistical quality control to create control charts.								K3		
CO5	Solve the problems of Ratio, Proportion & Partnership, Problem of ages, Allegation & Mixture, Direction, Blood relation, Simple & Compound interest, Permutation & Combination.								K3		
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)											
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8			
CO1	3	2	2	-	1	-	-	1			
CO2	3	3	3	-	-	-	-	1			
CO3	3	2	1	-	1	-	-	1			
CO4	3	2	2	-	1	-	-	1			
CO5	3	2	2	-	-	-	-	1			
Course Contents / Syllabus											
Unit 1	DESCRIPTIVE STATISTICS								6 hours		
Basic concept and Problems of Probability, Random Variable, Discrete Random Variable, Continuous Random Variable, Probability mass function, Probability Density Function, Distribution functions.											
Unit 2	PROBABILITY AND RANDOM VARIABLES								8 hours		
Primitive Stack operations: Push & Pop, mutual conversion of Infix, Prefix, Postfix, Evaluation of postfix expression Principles of recursion, Types of Recursions, Problem solving using iteration, Tower of Hanoi, Trade-offs between iteration and recursion. Operations on Queue: Create, Insert, Delete, Full and Empty, Circular queues, Dequeue and Priority Queue.											
Unit 3	PROBABILITY DISTRIBUTIONS								8 hours		
Expectations (For single Variable): Introduction, Expected Value of a Random Variable, Mean, Variance, Moment Generating Function, Probability Distributions: Binomial, Poisson, Normal distribution.											
Unit 4	TESTING OF HYPOTHESIS								13 hours		
Testing a Hypothesis, Null hypothesis, Alternative hypothesis, Level of significance, Confidence limits, Test of significance of difference of means, Z-test, t-test and Chi-square test, F-test, ANOVA: One way.											
Unit 5	APTITUDE-II								10 hours		
Ratio, Proportion & Partnership, Problem of ages, Allegation & Mixture, Direction, Blood relation, Simple & Compound interest, Permutation & Combination.											
									Total Lecture Hours		45 hours
Textbooks:											
								Authors Name			
1. Statistical Methods, Sultan Chand & Sons, 44 th Edition, 2019								S. P. Gupta			
2. Business Statistics, Pearson Education, 8 th Edition, 2017								Sharma, J. K			
Reference Books:								Authors Name:			
1. Quantitative Aptitude, Revised Edition, 2025								R.S. Aggrawal			
2. Quantitative Analysis for Management, 14 th Edition, 2022								Pearson Education			
Self-Study Content Links:										Duration (in Hrs)	
MOOCs		https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01389294348613222449/overview								05 Hrs	

Video Lectures	https://youtu.be/TWd42yUBZkk?si=PA4D8KQ-HgF65ebs	20 min
	https://youtu.be/cp7_ZF2kNi4?si=AgRIQVjIZkRg4nbZ	
	https://www.youtube.com/watch?v=-l2Y3L7Rz-	10 min
Web References	https://www.youtube.com/watch?v=SKQGxLRSuPA&list=PLhuxFrOdsq-uOv_vVNTr-1iCWDITII06	8 min
	https://www.geeksforgeeks.org/maths/statistics-in-computer-science/	

Course Code: DBCA0251		Course Name: Business Intelligence & Analytics Lab				L	T	P	C
Course Offered in: BCA 1 st Year						0	0	2	1
Pre-requisite: Basic understanding of computers and familiarity with Microsoft Excel.									
Course Objectives:									
Understand the basic of google analytics and how to track website data.									
Course Outcome: After completion of the course, the student will be able to						Bloom’s Knowledge Level (KL)			
CO1	Apply advance excel functions to carry out detailed calculations and facilitate data-driven decision-making.					K4			
CO2	Implement advanced Excel skills to transform and analyze data, and to create visual representations, formulas, functions, and pivot tables.					K5			
CO3	Develop Power BI reports by integrating data sources, visualizations and publishing them as multi-page dashboards.					K4			
CO4	Implement interactive dashboards and visual reports to articulate insights and support decision-making processes.					K3			
CO5	Analyze website tracking systems that encompass goal creation, event monitoring, and audience behavior analysis to support strategic objectives.					K5			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)									
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
CO1	2	3	2	3	2	1	1	2	
CO2	2	2	3	3	2	2	1	2	
CO3	2	2	2	3	1	1	1	2	
CO4	3	3	3	3	1	1	1	2	
CO5	2	3	3	3	3	2	1	2	
List Of Practical’s (Indicative & Not Limited To)									

S. No.	Practical	CO
Advanced Excel		CO1
1	Integrate Power BI with other Microsoft tools (e.g., Excel, SQL Server).	CO1
2	Explore advanced Power BI features (e.g., Machine Learning, R scripting).	CO1
3	Create a spreadsheet with basic formulas: SUM, AVERAGE, and COUNT.	CO1
4	Use colors to highlight cells that meet specific conditions.	CO1
5	Use the PivotTable to summarize and analyze data.	CO1
6	Create a line chart to display data over time.	CO1
7	Set up data validation rules to restrict user input.	CO1
8	Edit and modify a recorded macro.	CO1
9	Use conditional formatting to highlight cells that contain errors.	CO1
10	Use the VLOOKUP function to retrieve data from another table.	CO1
11	Use the Analysis ToolPak (ATP) to perform statistical analysis.	CO1
12	Use the PivotChart to summarize and analyze data.	CO1
13	Create a stacked area chart to display data over time.	CO1
14	Debug errors using the Visual Basic Editor.	CO1
15	Create an array formula using the SUMIFS function.	CO1
16	Use functions such as SUM, AVERAGE, and COUNT in formulas.	CO1
17	Edit and modify a recorded macro.	CO1

18	Debug errors using the Visual Basic Editor.	CO1
19	Highlight cells that meet multiple conditions using conditional formatting.	CO1
20	Use the Analysis ToolPak (ATP) to perform advanced statistical analysis.	CO1
Power BI		CO2
21	Create a new Power BI report and explore the interface.	CO2
22	Connect to a sample data source (e.g., Excel file) and import data into Power BI.	CO2
23	Create a new table from the imported data and customize its layout.	CO2
24	Filter and sort data in the table using various options.	CO2
25	Create a simple chart (e.g., bar chart) from the table data.	CO2
26	Add interactivity to the chart by enabling drill-down capabilities.	CO2
27	Create a new dashboard with multiple visualizations.	CO2
28	Create measures in the table and use them in visualizations.	CO2
29	Create a matrix visualization from the table data.	CO2
30	Create a DAX formula to calculate a custom measure.	CO3
31	Create a gauge visualization from the table data.	CO3
32	Use various visualizations (e.g., maps, trees) to represent data.	CO3
33	Create a KPI card visualization from the table data.	CO3
34	Publish the report to Power BI Service and share it with others.	CO3
35	Optimize performance by working with large datasets.	CO3
36	Create a story in Power BI using multiple visualizations.	CO3
37	Use Power BI APIs to automate tasks and integrate with other applications.	CO3
38	Create a custom visual using Power BI's visual development tools.	CO3
39	Integrate Power BI with other Microsoft tools (e.g., Excel, SQL Server).	CO3
40	Explore advanced Power BI features (e.g., Machine Learning, R scripting).	CO3
Google Analytics		CO4
41	Set up a Google Analytics account and track a website's basic metrics (page views, bounce rate, average session duration).	CO4
42	Set up goals and e-commerce tracking in Google Analytics.	CO4
43	Analyze audience demographics in Google Analytics.	CO4
44	Create segments in Google Analytics to analyze specific audience groups.	CO4
45	Track events in Google Analytics (e.g., form submissions, button clicks).	CO4
46	Analyze referral traffic in Google Analytics.	CO4
47	Set up funnels in Google Analytics to track user flow.	CO4
48	Create custom dashboards in Google Analytics.	CO5
49	Analyze user flow in Google Analytics.	CO5
50	Set up A/B testing in Google Analytics.	CO5
Total Lecture Hours		15 Hours

Course Code: DBCA0252	Course Name: Data Structure Lab	L	T	P	C
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Course Offered in: BCA	0	0	2	1
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Pre-requisite: Knowledge of programming languages, basics of mathematics, organizing & problem-solving ability.

Course Objectives:

Learn the basic concepts of algorithm analysis, along with implementation of linear and non-linear data structures.

Course Outcome: After completion of the course, the student will be able to

		Bloom's Knowledge Level (KL)
CO1	Analyse systematic approach to organizing, writing and debugging Array programs.	K4
CO2	Implement Stack and Queue.	K3
CO3	Develop operations of linked list.	K5
CO4	Construct non-linear data structure operations.	K5
CO5	Implement sorting and searching algorithms using relevant data structures.	K3

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	2	3	1	1	1	2
CO2	3	3	2	2	2	1	1	1
CO3	3	3	3	2	2	1	1	2
CO4	3	3	3	3	2	1	2	2
CO5	3	3	3	3	2	1	1	2

List Of Practical's (Indicative & Not Limited To)

S. No.	Practical	CO
Basic Python (Syntax, Variable, Type Conversion)		CO1
1	Create a program to find the maximum element in an array.	CO1
2	Design a code to calculate the sum of all elements in an array.	CO1
3	Write a program to reverse the elements of an array.	CO1
4	Design a code to check if an array is sorted in ascending order.	CO1
5	Design a code to count the occurrence of a specific element in an array.	CO1
6	Write a program for creation and traversal of a 2D array in row-major and column-major order.	CO1
7	Write a program to print the transpose of a given matrix using a function.	CO1
8	Write a program to find if a given matrix is sparse or not and print the sparse matrix.	CO1
Searching		CO2
9	Create a code to implement Linear Search.	CO1
10	Write a program to implement Binary Search.	CO1
Stack		CO2
11	Implementation of stack using a list.	CO2
12	Construct a Python code for Infix to Postfix conversion using a stack.	CO2
13	Construct a code for Balanced Parentheses Checker using a stack.	CO2
14	Implement Reverse a String using a stack.	CO2
15	Implement Binary Search using Recursion.	CO2

16	Construct a Python program to print Fibonacci Series using Recursion.	CO2
Queue		CO3
17	Queue implementation using a list.	CO3
18	Construct a code for simulating a printer queue using a queue.	CO3
19	Construct a code for implementing a circular queue.	CO3
20	Implement queue using stack.	CO3
Linked List		CO4
21	Create a singly linked list and perform insertion, deletion, and traversal.	CO4
22	Create a doubly linked list and perform insertion, deletion, and traversal.	CO4
23	Create a circular linked list and perform insertion, deletion, and traversal.	CO4
24	Reverse a singly linked list.	CO4
25	Check if a linked list is a palindrome.	CO4
26	Reverse a doubly linked list.	CO4
27	Find the middle element of a singly linked list.	CO4
28	Find the middle element of a doubly linked list.	CO4
29	Merge two sorted singly linked lists.	CO4
30	Detect and remove a loop in a circular linked list.	CO4
Binary Tree		CO5
31	Construct a code to insert, delete, search, and update data in a Binary Search Tree (BST).	CO5
32	Construct a code for tree traversal (Preorder, Inorder, Postorder).	CO5
33	Construct a code to count the number of leaves in a binary tree.	CO5
34	Construct a code to find the height of a binary tree.	CO5
35	Construct a code to print all paths from the root to leaf nodes in a binary tree.	CO5
36	Construct a code to convert a binary tree to its mirror tree.	CO5
BST		CO5
37	Construct a code to find the node with the minimum value in a Binary Search Tree.	CO5
38	Construct a code for Binary Search Tree (BST) implementation.	CO5
39	Write a program to check if a binary tree is a Binary Search Tree (BST).	CO5
AVL Tree		CO5
40	Construct a code to check if a binary tree is a balanced binary tree.	CO5
Graph		CO5
41	Construct a code to represent a graph using an adjacency matrix and adjacency list.	CO5
42	Implement BFS and DFS algorithms.	CO5
43	Implement the Minimum Cost Spanning Tree algorithm.	CO5
Sorting		CO5
44	Implement Bubble Sort in a non-recursive way.	CO5
45	Implement Selection Sort in a non-recursive way.	CO5
46	Implement Insertion Sort in a non-recursive way.	CO5
47	Implement Merge Sort in a non-recursive way.	CO5
48	Implement Merge Sort in a recursive way.	CO5
49	Implement Quick Sort in a recursive way.	CO5
50	Implement Heap Sort in a non-recursive way.	CO5
Total Lecture Hours		15 hours

Course Code: DBCA0253	Course Name: Introduction to Networks Lab				L	T	P	C
Course Offered in: BCA 1 st Year					0	0	2	1
Pre-requisite: Basic knowledge of computer system								
Course Objectives:								
The objective of this course is to enable students to identify network devices, cables, and topologies used in basic network setups and understand how data is transmitted through networks using the OSI and TCP/IP models. The course also aims to develop practical skills in building and configuring small networks, assigning and verifying IP addresses, and testing and troubleshooting network connectivity using tools and commands such as ping, tracer, and Access Control Lists (ACLs).								
Course Outcome: After completion of the course, the student will be able to							Bloom's Knowledge Level (KL)	
CO1	Design and build a simple computer network by identifying and connecting network devices, media, and topologies using Packet Tracer or real hardware.						K3	
CO2	Configure and verify IPv4/IPv6 addressing, subnetting, and basic routing parameters to establish end-to-end connectivity between network devices.						K3	
CO3	Acquire the knowledge of memory allocation and binding, array, structure to solve complex problems						K4	
CO4	Configure and troubleshoot VLANs, trunking, STP, EtherChannel, dynamic routing, DHCP, NAT, and inter-VLAN routing services for efficient enterprise network operation.						K4	
CO5	Analyze and troubleshoot network connectivity and performance using Cisco IOS verification, monitoring, and diagnostic commands in simulated or real networking environments.						K5	
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)								
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	2	2	1	-	-	1
CO2	3	3	3	2	1	-	-	2
CO3	3	3	3	2	1	-	-	2
CO4	3	2	2	2	1	-	1	1
CO5	3	2	2	3	2	2	2	3
List of Practical's (Indicative & Not Limited To)								CO
1	Familiarization with Cisco Packet Tracer.							CO1
2	Build a basic LAN with PCs, switches, and a router; verify connectivity using ping.							CO1
3	Cisco IOS CLI Navigation: configure hostname, privileged EXEC password (enable secret), console/VTY passwords, banners, and save configuration.							CO1
4	IPv4 Subnetting and Addressing: design an addressing scheme for a given number of subnets using VLSM; assign addresses and verify reachability.							CO2
5	IPv6 Configuration: configure GUA and Link-Local addresses; enable SLAAC; verify with show commands and ping6.							CO2
6	VLAN Configuration: create VLANs, assign access ports, verify VLAN database; test intra-VLAN and inter-VLAN reachability.							CO2
7	802.1Q Trunking and DTP: configure trunk links between switches; verify allowed VLANs and native VLAN; analyze DTP negotiation.							CO2
8	Spanning Tree Protocol: observe STP root bridge election and port roles; compare STP vs. RSTP convergence time; configure PortFast and BPDU Guard.							CO2



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9	EtherChannel: configure LACP and PAGP EtherChannel; verify bundle status and load balancing.	C02
10	Static Routing: configure IPv4 static and default routes; verify routing table with show ip route; trace path using traceroute.	C03
11	RIPv2 Configuration: enable RIPv2 on a multi-router topology; verify route propagation; configure passive interface and default route redistribution.	C03
12	OSPFv2 Single-Area: configure OSPF, assign Router-ID, verify neighbor adjacency (FULL state), DR/BDR election; tune interface cost.	C04
13	Inter-VLAN Routing: implement Router-on-a-Stick with subinterfaces; implement SVI-based inter-VLA routing on a Layer-3 switch; compare both methods.	C04
14	DHCPv4 Configuration: configure a Cisco router as DHCPv4 server; configure DHCP exclusions and pool; verify client address assignment; configure ip helper-address.	C05
Total Lecture Hours		15 hours

Course Code: DBCA0255	Course Name: Problem Solving using Python Lab	L	T	P	C
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Course Offered in: BCA 1st Year

0 0 6 3

Pre-requisite: Students are expected to be able to open command prompt window or terminal window, edit a text file, download and install software, and understand basic programming concepts.

Course Objectives:

Objective of this course is to impart knowledge of basic building blocks of Python programming, provide skills to design algorithms for problem solving, implementation and debugging of programs in Python using modules & packages, disseminate the knowledge of basic data structures.

Course Outcome: After completion of the course, the student will be able to

Bloom's Knowledge Level (KL)

CO1	Implement python programming logic.	K3
CO2	Develop decision-making and iterative control statements in Python.	K4
CO3	Create user defined functions and modules in python.	K4
CO4	Demonstrate the use of python data structures—lists, tuples, set, dictionaries.	K5
CO5	Apply file operations and exceptional handlings in Python.	K3

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	2	3	1	1	1	2
CO2	3	2	2	3	2	1	1	3
CO3	3	3	3	3	1	1	1	3
CO4	3	3	3	3	2	1	1	3
CO5	3	3	3	3	2	1	2	3

List Of Practical's (Indicative & Not Limited To)

S. No.	Experiment	CO
	Basic Python (Syntax, Variable, Type Conversion)	CO1
1	Python Program to Print Statement.	CO1
2	Swap two variables without using a temporary variable.	CO1
3	Convert a string to an integer.	CO1
4	Convert an integer to a string.	CO1
5	Write a program to demonstrate implicit and explicit type conversion.	CO1
	Operators	CO1
6	Write a program to Calculate Sum of 5 Subjects and Find Percentage (Maximum marks in each subject = 100).	CO1
7	Write a program to find gross salary.	CO1
8	Write a program to Calculate Area of Rectangle and Square.	CO1
9	Write a program to Calculate Area of Scalene Triangle and Right-angle Triangle.	CO1
10	Write a program to find the perimeter of a circle, rectangle, and triangle.	CO1
11	Write a program to Compute Simple Interest.	CO1
12	Write a program to Convert Fahrenheit temperature into Celsius.	CO1
13	Write a program to apply bitwise operations on a = 8, b = 3.	CO1
14	Write a program to apply identity operators.	CO1
15	Write a program to Swap the Contents of Two Numbers using Bitwise XOR Operation.	CO1
16	Write a program to Add Two Complex Numbers.	CO1
17	Write a Program to find the roots of a quadratic equation.	CO1
	Logical Operator	CO2



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18	Write a program to apply Logical AND operator on two operands.	CO2
19	Write a program to apply Logical OR operator on two operands.	CO2
20	Write a program to apply Logical NOT operator on an operand.	CO2
21	Write a program to Check whether a given Number is an Armstrong Number.	CO3
22	Write a program to print all prime numbers from 1-500.	CO3
23	Write a program to display the following pattern: * * * * * * * * * * * * * * *	CO3
24	Write a program to display the following pattern: 1 1 2 1 2 3 1 2 3 4 1 2 3 4 5	CO3
25	Write a program to display the following pattern: A B B C C C D D D D E E E E E	CO3
26	Write a program to display the following pattern: * * * * *	CO3



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	<pre>***** *** ** *</pre>	
27	Write a program to display the following pattern: <pre>1 2 3 4 5 1 2 3 4 1 2 3 1 2 1</pre>	CO3
28	Write a program to display the following pattern: <pre>***** ***** ***** *** *</pre>	CO3
29	Write a program to display the following pattern (Pascal Triangle): <pre>1 1 1 1 2 1 1 3 3 1 1 4 6 4 1</pre>	CO3



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	1 5 10 10 5 1	
30	Write a program to display the following pattern: 1 2 3 4 5 6 7 8 9 10	CO3
31	Write a program to display the following pattern: A B C D E F G F E D C B A A B C D E F F E D C B A A B C D E E D C B A A B C D D C B A	CO3
32	Write a program to display the following pattern: A BAB CBABC DCBABCD EDCBA BCDE	CO3
33	Write a program to Find the Sum of A.P Series.	CO3
34	Write a program to find the Sum of following Series: $(1*1) + (2*2) + (3*3) + (4*4) + (5*5) + \dots + (n*n)$	CO3
35	Write a program to find the Sum of following Series: $(1^1) + (2^2) + (3^3) + (4^4) + (5^5) + \dots + (n^n)$	CO3
36	Write a program to find the Sum of following Series: $(1!/1) + (2!/2) + (3!/3) + (4!/4) + (5!/5) + \dots + (n!/n)$	CO3
37	Write a program to print the following Series: 1, 2, 3, 6, 9, 18, 27, 54, ... up to n terms	CO3
38	Write a program to print the following Series: 2, 15, 41, 80, 132, 197, 275, 366, 470, 587	CO3
39	Write a program to print the following Series: 1, 3, 4, 8, 15, 27, 50, 92, 169, 311	CO3
40	Write a program to Convert the given Binary Number into Decimal.	CO3
41	Write a program to find out L.C.M. of two numbers.	CO3
42	Write a program to find out H.C.F. of two numbers.	CO3
43	Python Program to Accept Three Digits and Print all Possible Combinations from the Digits.	CO3
44	Python Program to Count the Number of Digits in Number.	CO3
	Functions	CO3
45	Write a Python function to find the maximum of three numbers.	CO3
46	Write a Python function to sum all the numbers in a list. Sample List: (8, 2, 3, 0, 7) Expected Output: 20	CO3
47	Write a Python program to reverse a string. Sample String: "1234abcd" Expected Output: "dcba4321"	CO3



48	Write a Python function to check whether a number falls within a given range.	CO3
49	Write a Python function that accepts a string and calculates the number of uppercase and lowercase letters. Sample String: "The quick Brow Fox" Expected Output: Uppercase Letters = 3, Lowercase Letters = 13	CO3
50	Write a Python function that takes a number as a parameter and checks whether the number is prime or not.	CO3
51	Write a Python function that checks whether a passed string is a palindrome or not.	CO3
52	Write a Python function that prints the first n rows of Pascal's Triangle.	CO3
53	Write a Python function that accepts a hyphen-separated sequence of words as input and prints the words in alphabetical order. Sample Input: green-red-yellow-black-white	CO3
54	Write a Python function to convert height (in feet and inches) to centimeters.	CO3
55	Write a Python function to convert Celsius to Fahrenheit.	CO3
56	Implement a Python function to check whether two strings are anagrams of each other.	CO3
57	Write a Python function to display all Armstrong numbers from 1 to n.	CO3
	Recursion	CO4
58	Write a program using recursion to compute the factorial of a given number.	CO4
59	Write a program to print the Fibonacci series using recursion.	CO4
60	Write a program to calculate the sum of numbers from 1 to N using recursion.	CO4
61	Write a program to find the sum of digits of a number using a recursive function.	CO4
62	Write a program to solve the Tower of Hanoi problem using recursion.	CO4
63	Write a Python program to determine how many times a given letter occurs in a string recursively.	CO4
64	Write a Python program to find the binary equivalent of a number recursively.	CO4
	Modules and Packages	CO4
65	Write a program to create a module and import the module into another Python program.	CO4
66	Write a program to import all objects from a module, specific objects from a module, and provide a custom alias to the imported object.	CO4
67	Create a Python package containing at least two modules.	CO4
68	Create a Python package containing at least one subpackage.	CO4
-	String	CO4
69	Python program to check whether a string is symmetrical or a palindrome.	CO4
70	Python program to remove the ith character from a string.	CO4
71	Python program to check if a substring is present in a given string.	CO4
72	Python program to find the length of a string in four different ways.	CO4
73	Python program to print even-length words in a string.	CO4
74	Python program to accept strings that contain all vowels.	CO4
75	Python program to remove all duplicate characters from a string.	CO4
76	Python program to find the maximum frequency character in a string.	CO4
77	Python program to replace all occurrences of 'a' with \$ in a string.	CO4
78	Python program to form a new string by exchanging the first and last characters.	CO4
79	Python program to count the number of vowels in a string.	CO4
80	Python program to replace every blank space in a string with a hyphen.	CO4
81	Python program to calculate the length of a string without using a library function.	CO4
82	Python program to remove the characters at odd index values in a string.	CO4
83	Python program to calculate the number of words and characters present in a string.	CO4
84	Python program to display the larger of two strings without using built-in functions.	CO4
85	Python program to check if a string is a pangram.	CO4
86	Python program to accept a hyphen-separated sequence of words and print them in alphabetical order.	CO4
87	Python program to form a new string using the first two and last two characters of a given string.	CO4
88	Python program to count the occurrences of each character in a given string.	CO4
89	Python program to check if a substring is present in a given string.	CO4
90	Python program to find the most repeated word in a string.	CO4
	Regular Expression	CO4
91	Write a Python program to validate a password using regular expressions based on the given criteria.	CO4
92	Write a Python program to validate a mobile number.	CO4
93	Given a file containing names and phone numbers, write a Python program using regular expressions to find all names having a phone number with a 3-digit area code.	CO4
	List	CO4



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94	Program to interchange the first and last elements in a list.	CO4
95	Write a program to find the minimum, maximum, and average of elements in a numeric list.	CO4
96	Program to check if an element exists in a list.	CO4
97	Program for reversing a list.	CO4
98	Program to multiply all numbers in a list.	CO4
99	Program to find the smallest and largest number in a list.	CO4
100	Program to find the second largest number in a list.	CO4
101	Program to print all even numbers in a range.	CO4
102	Program to print all negative numbers in a range.	CO4
103	Program to remove multiple elements from a list in Python.	CO4
104	Program for cloning or copying a list.	CO4
105	Program to count occurrences of an element in a list.	CO4
106	Program to find the cumulative sum of a list.	CO4
107	Program to break a list into chunks of size N in Python.	CO4
108	Python Program to transpose a matrix.	CO4
109	Python Program to add two matrices.	CO4
110	Python Program to multiply two matrices.	CO4
111	Program to get the Kth column of a matrix.	CO4
112	Write a program to print all even numbers of a list using list comprehension.	CO4
113	Write a program that prompts the user to enter an alphabet and prints all words starting with that alphabet from a list of words.	CO4
114	Write a program to transpose a given matrix using list comprehension.	CO4
115	Print all the characters of a string using list comprehension.	CO4
116	Write a program to calculate the square of numbers up to n using list comprehension.	CO4
	Tuple	CO4
117	Python program to find the size of a tuple.	CO4
118	Python program to find the maximum and minimum Kth elements in a tuple.	CO4
119	Create a list of tuples from a given list having each number and its cube.	CO4
120	Python program to flatten a tuple of lists into a tuple.	CO4
	Set	CO4
121	Python Program to Count the Number of Vowels Present in a String using Sets.	CO4
122	Python Program to Check Common Letters in Two Input Strings.	CO4
123	Python Program that Displays Which Letters are in the First String but not in the Second.	CO4
	Dictionary	CO4
124	Python Program to Add a Key-Value Pair to a Dictionary.	CO4
125	Python Program to Concatenate Two Dictionaries into One.	CO4
126	Python Program to Check if a Given Key Exists in a Dictionary or Not.	CO4
127	Python Program to Generate a Dictionary that Contains Numbers (1 to n) in the Form (x, x*x).	CO4
128	Python program to create an Ordered Dictionary from a given dictionary, sort it during creation, and print the members in reverse order.	CO4
129	Python Program to Sum All the Items in a Dictionary.	CO4
130	Write a program to create a dictionary having the characters of a given string as keys and their frequencies as values.	CO4
131	Python Program to Multiply All the Items in a Dictionary.	CO4
132	Python Program to Remove a Given Key from a Dictionary.	CO4
133	Python Program to Form a Dictionary from an Object of a Class.	CO4
134	Python Program to Map Two Lists into a Dictionary.	CO4
	Comprehension	CO4
135	Write a program to filter even numbers from a list using tuple comprehension.	CO4
136	Create a list of tuples from two lists using comprehension.	CO4
137	Extract the first character from each word in a list of strings using comprehension.	CO4
138	Write a program for swapping keys and values in a dictionary.	CO4
139	Write a program for filtering even numbers from a dictionary.	CO4
140	Write a program to calculate the square of numbers using dictionary comprehension.	CO4
	File Handling and Exception Handling	CO5
141	Python program to read a file word by word.	CO5
142	Python program to read a file character by character.	CO5



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143	Python program to get the number of characters, words, spaces, and lines in a file.	CO5
144	Program to find n-character words in a text file.	CO5
145	Python program to obtain the line number in which a given word is present.	CO5
146	Python program to count the number of lines in a text file.	CO5
147	Python program to remove lines starting with a given prefix.	CO5
148	Python program to eliminate repeated lines from a file.	CO5
149	Python program to read a list of dictionaries from a file.	CO5
150	Python program to append the content of one text file to another.	CO5
151	Python program to copy odd lines from one file to another.	CO5
152	Python program to merge two files into a third file.	CO5
153	Python program to reverse a single line of a text file.	CO5
154	Python program to reverse the contents of a file and store them in another file.	CO5
155	Python program to handle the divide-by-zero exception.	CO5
156	Write a program to handle multiple exceptions.	CO5
157	Python program to combine each line from the first file with the corresponding line from the second file.	CO5
158	Write a program to copy the contents of one file to another.	CO5
159	Write a program to print the first five lines of a file.	CO5
160	A) Write a program to catch the following exceptions: ValueError, IndexError, NameError, TypeError, and ZeroDivisionError. B) Create user-defined exceptions. C) Demonstrate the use of else and finally blocks with try. D) Write a Python program that uses raise and an exception class to throw an exception.	CO5
Total Lecture Hours		72 Hours

Course Code: DBCA0258	Course Name: Workplace Communication Lab 2				L	T	P	C
Course Offered in: BCA 1 st Year					0	0	4	2
Pre-requisite: The students should have completed the Workplace Communication course in the first semester								
Course Objectives:								
To improve proficiency in Business English to the B1/B2 (Intermediate) of CEFR.								
Course Outcome: After completion of the course, the student will be able to					Bloom's Knowledge Level (KL)			
CO1	Understand the role and importance of various communication skills essential for career development.				K2			
CO2	Develop and apply effective listening skills in both personal and Professional contexts.				K6			
CO3	Demonstrate fluency and spontaneity while speaking.				K3			
CO4	Read and interpret complex written texts.				K2			
CO5	Construct clear and concise texts on a variety of topics.				K6			
CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)								
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	-	1	-	-	3	-	-	3
CO2	-	-	-	-	3	-	-	2
CO3	-	-	-	-	3	-	-	2
CO4	-	2	-	-	-	-	-	2
CO5	-	1	-	-	3	-	-	2
List Of Practical's (Indicative & Not Limited To)								

S.No.	Practical	CO
1	Introduction to the course and the evaluation scheme. Students will gain knowledge about the examination pattern.	CO1
2	Active Listening Role-Play. Students practice active listening techniques such as paraphrasing and asking clarifying questions.	CO2
3	Professional Self-Introduction. Students prepare and deliver brief introductions focusing on clarity and professionalism.	CO3
4	Annotating Professional Documents. Students identify main ideas, key terms, and important details.	CO4
5	Writing Reflective Journal Entries to document learning experiences and communication practices.	CO5
6	Active Listening in Group Networking Sessions.	CO2
7	Small Talk Practice Sessions.	CO2
8	Reading for Tone and Intention.	CO1
9	Writing Responses to Common Text Messages.	CO3
10	Listening Comprehension Quiz based on a recorded webinar or online meeting.	CO3
11	Virtual Panel Discussion on digital communication.	CO3
12	Analyzing Digital Content by evaluating evidence and logic.	CO4
13	Creating Digital Etiquette Guides for ethical and effective communication.	CO4
14	Identifying Barriers to Effective Listening and discussing strategies to overcome them.	CO2
15	Role-Playing Handling Interruptions and Objections in professional conversations.	CO1
16	Speed-Reading and Comprehension Exercise.	CO3
17	Miscommunication Reflection to identify and avoid communication errors.	CO5
18	Listen and Speak Activity: Listen, summarize the gist, and repeat verbatim.	CO2
19	Choosing a Topic and Speaking on It using effective presentation openings.	CO3
20	Group Talk on relevant and trending presentation topics with justification.	CO3
21	Case Study Analysis using real-time situations to develop critical thinking and communication skills.	CO1

Course Code: DBCA0259	Course Name: Field Activities for Community Engagement	L	T	P	C
Course Offered in: BCA 1 st Year		0	0	2	-

Pre-requisite: None

Course Objectives:

To develop an appreciation of rural culture, lifestyle and wisdom amongst students.

Course Outcome: After completion of the course, the student will be able to

Bloom's Knowledge Level (KL)

CO1	Understand rural life, Indian culture & ethos and social realities.	K2
CO2	Develop a sense of empathy and bonds of mutuality with local community.	K3
CO3	Appreciate significant contributions of local communities to Indian society and economy.	K2
CO4	Learn to value the local knowledge and wisdom of the community.	K2
CO5	Identify opportunities for contributing to community's socioeconomic improvements.	K3

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1	2	1	1	2	1	3	2
CO2	1	2	2	1	3	1	3	2
CO3	1	2	2	1	2	2	3	2
CO4	1	2	2	1	2	1	3	3
CO5	2	3	3	1	3	2	3	3

List Of Activities (Indicative & Not Limited To)

1. Interaction with Self-Help Group (SHG) women members, and study of their functions and challenges; planning for their skill building and livelihood activities
2. Visit MGNREGA project sites, interact with beneficiaries and interview functionaries at the work site
3. Field visit to Swachh Bharat project sites, conduct analysis and initiate problem-solving measures
4. Conduct Mission Antyodaya surveys to support under Gram Panchayat Development Plan (GPDP)
5. Interactive community exercise with local leaders, panchayat functionaries, grass-root officials and local institutions regarding village development plan preparation and resource mobilization
6. Visit Rural Schools / mid-day meal centers, study academic and infrastructural resources and gaps
7. Participate in Gram Sabha meetings, and study community participation
8. Associate with Social audit exercises at the Gram Panchayat level, and interact with program beneficiaries
9. Visit to local Nagarpalika office and review schemes for urban informal workers and migrants
10. Attend Parent Teacher Association meetings, and interview school drop outs
11. Visit local Anganwadi Centre and observe the services being provided
12. Visit local NGOs, civil society organization's and interact with their staff and beneficiaries,
13. Organize awareness programs, health camps, Disability camps and cleanliness camps
14. Conduct soil health test, drinking water analysis, energy use and fuel efficiency surveys
15. Raise understanding of people's impacts of climate change, building up community's disaster preparedness