



University of Engineering and Management
Institute of Engineering & Management, Salt Lake
Campus Institute of Engineering & Management, New Town
Campus
University of Engineering & Management, Jaipur



3rd Semester Syllabus for BCA Admission Batch 2024

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University of Engineering and Management
Institute of Engineering & Management, Salt Lake Campus
Institute of Engineering & Management, New Town Campus
University of Engineering & Management, Jaipur



Syllabus and Lesson Plan for BCA Admission Batch 2024

Subject Name: **Design and Analysis of Algorithms**

Credit: 4

Lecture Hours: 48

Subject Code: **BCACC301**

Maximum: 100 marks (Internal: 30 marks; External: 70 marks)

List of Faculty Members handling the Subject –

1. Dr. Biswajit Maity
2. Prof. Kaustav Sarkar
3. Prof. Manjima Saha

Pre-requisite: Basic knowledge of data structures, logic building, and programming in C/C++

Relevant Links:

1. Link for Study Material:

https://drive.google.com/file/d/1PqePorgnsiqtcwOtAfVR6L90Vc0sUkNP/view?usp=drive_link

2. Link for NPTEL Course:

<https://archive.nptel.ac.in/courses/106/105/106105164/>

3. Link for Coursera Course:

<https://www.coursera.org/learn/algorithmic-toolbox>

4. Link for LinkedIn Learning Course:

<https://www.linkedin.com/learning/foundations-of-algorithmic-thinking-with-python/importance-of-algorithmic-thinking?u=229219690>

COURSE OBJECTIVES:

1. To study basic concepts of algorithm design and performance analysis.
2. To explore strategies like Divide & Conquer, Greedy, Dynamic Programming, and Backtracking.
3. To apply algorithms in graph problems and optimization tasks.
4. To understand NP-completeness and intractable problems.

COURSE OUTCOMES:

CO1: Analyse algorithm efficiency using theoretical and empirical approaches.

CO2: Apply appropriate algorithmic techniques to solve real-world problems.

CO3: Design algorithms using various strategies such as divide-and-conquer, greedy, and dynamic programming.

CO4: Identify intractable problems and understand the relevance of NP-completeness.

Module No.	Topic	Sub-Topics	Chapter Name and Book	Mapping with Industry and International Academia	Lecture Hours
Module 1	Introduction to Algorithm Analysis	Characteristics of algorithms, problem-solving steps, algorithm representation	Horowitz & Sahni (Ch. 1), Cormen (Ch. 2)	Academia: MIT OCW – https://ocw.mit.edu/courses/6-006-introduction-to-algorithms-spring-2020/6.006 Industry: HackerRank, LeetCode problem-solving frameworks	3
	Performance Analysis & Asymptotic Notation	Time & space complexity, best/average/worst case, Big-O, Omega, Theta, time-space tradeoffs	Horowitz & Sahni (Ch. 1), Cormen (Ch. 3)	Academia: Stanford Algorithms Course - https://www.coursera.org/specializations/algorithms Industry: Runtime estimation in web search, ML model optimization	4
	Recursion and Recurrence Relations	Substitution method, recursion tree method, Master's theorem	Cormen (Ch. 4), Horowitz (Ch. 2)	Academia: https://www.cs.princeton.edu/~guru/226/info.html	3

				Industry: Image processing, divide & conquer algorithms in libraries like OpenCV	
Module 2	Divide-and-Conquer Algorithms	Strategy overview, Merge Sort, Quick Sort, Selection algorithms, Matrix Chain Multiplication	Cormen (Ch. 4, 15)	Academia: https://ocw.mit.edu/courses/6-046j-design-and-analysis-of-algorithms-spring-2015/ Industry: Sorting/search in DBMS, compiler optimizations	2
	Greedy Algorithms	Strategy overview, Fractional Knapsack, Huffman Coding, Job Sequencing with deadlines	Horowitz (Ch. 3), Cormen (Ch. 16)	Academia: https://www.youtube.com/watch?v=EcT-Jt5WStw Industry: Data compression (ZIP), deadline-based CPU scheduling	3
	Minimum Spanning Trees	Kruskal's Algorithm, Prim's Algorithm, Disjoint Set Union (DSU)	Cormen (Ch. 23)	Academia: Stanford Algorithms Industry: Network design, cable layout, spanning tree in routing protocols	2
Module 3	Dynamic Programming	Strategy, 0/1 Knapsack, Multistage Graphs	Horowitz (Ch. 5), Cormen (Ch. 15)	Academia: https://www.udacity.com/course/data-structures-and-algorithms-nanodegree--nd256 Industry: Path planning, resource optimization in cloud platforms	3
	Shortest Path Algorithms	Floyd-Warshall (all pairs), Dijkstra (single source), negative weights, adjacency matrix/list	Cormen (Ch. 24, 25)	Academia: https://onlinecourses.nptel.ac.in/noc24_cs92/preview Industry: Path-finding (Google Maps), dynamic routing in traffic systems	5

	Graph Traversal	DFS, BFS, Connected and Biconnected components	Cormen (Ch. 22)	Academia: Georgia Tech CS1332 - https://www.edx.org/certificates/professional-certificate/gtx-data-structures-and-algorithms Industry: Friend suggestions in Facebook, recommender systems	5
Module 4	Backtracking Algorithms	General strategy, 8-Queens, Subset Sum, Graph Coloring, Hamiltonian Cycles	Horowitz (Ch. 6), Aho et al.	Academia: Princeton Recursive Problem Solving Industry: Constraint satisfaction in scheduling, puzzle solvers	5
	Branch and Bound	Strategy, bounding functions, solving TSP, upper/lower bounds	Horowitz (Ch. 6)	Academia: https://ocw.mit.edu/courses/6-006-introduction-to-algorithms-spring-2020/6.006 Industry: Logistics & delivery optimization (e.g., Amazon, FedEx)	4
Module 5	Introduction to Computational Complexity	Classes P, NP, NP-Hard, NP-Complete, tractability concepts	Cormen (Ch. 34), Horowitz (Ch. 7)	Academia: https://ocw.mit.edu/courses/6-006-introduction-to-algorithms-spring-2020/6.006 Complexity Theory Industry: Complexity understanding in AI systems, database optimization	3
	Reductions and NP-Complete Problems	Polynomial-time reductions, Subset Sum, SAT, 3-CNF-SAT, Clique problem	Horowitz (Ch. 7), Aho et al.	Academia: CMU Theoretical CS https://www.cs.cmu.edu/~15251/course-info.html Industry: Logic solvers, secure protocol verifiers	3
	Intractability and Lower Bound Theory	Introduction to intractability, lower bound techniques, implications	Horowitz (Ch. 7)	Academia: edX Complexity Classes Industry: Feasibility study for real-world NP-Hard scenarios	3

Module 1: Introduction analysis of algorithms:

2nd Year, Sec A (Faculty Name – Dr. Biswajit Maity, Prof. Manjima Saha)

2nd Year, Sec B (Faculty Name – Prof. Manjima Saha. Kaustav Sarkar)

2nd Year, Sec C (Faculty Name – Dr. Biswajit Maity, Prof. Kaustav Sarkar)

Working Day	Lesson Plan Description
Day 1	Characteristics of algorithms; steps of algorithm design
Day 2	Importance of algorithms in computing and real-world applications
Day 3	Time and space complexity; concept of input size and primitive operations
Day 4	Big-O notation; analyzing simple iterative algorithms
Day 5	Best, worst, and average-case complexity with examples
Day 6	Theta and Omega notations; asymptotic comparison among algorithms
Day 7	Introduction to recursion; recurrence relations with simple examples
Day 8	Substitution method for solving recurrences
Day 9	Recursion tree method and visual recurrence solving
Day 10	Master's Theorem and its applications to divide-and-conquer analysis

Module 2: Divide-&-Conquer and Greedy Method

2nd Year, Sec A (Faculty Name – Dr. Biswajit Maity, Prof. Manjima Saha)

2nd Year, Sec B (Faculty Name – Prof. Manjima Saha. Kaustav Sarkar)

2nd Year, Sec C (Faculty Name – Dr. Biswajit Maity, Prof. Kaustav Sarkar)

Working Day	Lesson Plan Description
Day 11	Divide-and-conquer strategy and algorithm design pattern
Day 12	Merge Sort: algorithm, analysis, and implementation

Day 13	Quick Sort: pivot selection, complexity in different cases
Day 14	Selection problem (Median of Medians) and Matrix Chain Multiplication
Day 15	Greedy Strategy: conceptual introduction and problem patterns
Day 16	Fractional Knapsack: algorithm and correctness
Day 17	Huffman Coding: binary trees and prefix encoding
Day 18	Job sequencing with deadlines: greedy scheduling
Day 19	Prim's Algorithm: MST using priority queues
Day 20	Kruskal's Algorithm and Disjoint Set Union structure

Module 3: Dynamic Programming and Graph Algorithms:

2nd Year, Sec A (Faculty Name – Dr. Biswajit Maity, Prof. Manjima Saha)

2nd Year, Sec B (Faculty Name – Prof. Manjima Saha, Kaustav Sarkar)

2nd Year, Sec C (Faculty Name – Dr. Biswajit Maity, Prof. Kaustav Sarkar)

Working Day	Lesson Plan Description
Day 21	Introduction to Dynamic Programming: overlapping subproblems and optimal substructure
Day 22	0/1 Knapsack: problem, table filling, and reconstruction of solution
Day 23	Multistage Graphs: optimal path determination using DP
Day 24	Floyd-Warshall Algorithm: all-pairs shortest path
Day 25	Dijkstra's Algorithm: single-source shortest path
Day 26	Introduction to Graphs: representations (adjacency list/matrix)
Day 27	DFS: implementation and applications (topological sort, cycle detection)
Day 28	BFS: implementation and shortest path in unweighted graphs
Day 29	Connected and Biconnected Components using DFS
Day 30	Graph practice: lab discussion on shortest paths and traversals

Module 4: Back Tracking and Branch-&-Bound:

2nd Year, Sec A (Faculty Name – Dr. Biswajit Maity, Prof. Manjima Saha)

2nd Year, Sec B (Faculty Name – Prof. Manjima Saha, Kaustav Sarkar)

2nd Year, Sec C (Faculty Name – Dr. Biswajit Maity, Prof. Kaustav Sarkar)

Working Day	Lesson Plan Description
Day 31	Backtracking: strategy, space tree, pruning
Day 32	8-Queens problem using backtracking
Day 33	Sum of Subsets problem and subset enumeration
Day 34	Graph Colouring problem: colouring using recursive backtracking
Day 35	Hamiltonian Cycle: path validation using backtracking
Day 36	Introduction to Branch and Bound
Day 37	Travelling Salesman Problem: bounding functions and cost matrix
Day 38	State-space tree analysis in BnB
Day 39	Lab application: backtracking vs BnB comparison and complexity study

Module 5: Lower Bound Theory and NP-Completeness:

2nd Year, Sec A (Faculty Name – Dr. Biswajit Maity, Prof. Manjima Saha)

2nd Year, Sec B (Faculty Name – Prof. Manjima Saha, Kaustav Sarkar)

2nd Year, Sec C (Faculty Name – Dr. Biswajit Maity, Prof. Kaustav Sarkar)

Working Day	Lesson Plan Description
Day 40	Complexity Classes: P, NP, NP-Hard, NP-Complete definitions
Day 41	Polynomial-time verifiability and decision problems
Day 42	Polynomial reductions: theory and strategy
Day 43	Example: Subset Sum to 0/1 Knapsack reduction
Day 44	SAT and 3-CNF SAT reductions; introduction to Cook's Theorem

Day 45	Other NP-Complete problems: Clique, Vertex Cover, TSP
Day 46	Intractability, approximation, and heuristic approaches
Day 47	Industry relevance: problems that remain NP-Complete in real systems
Day 48	Comprehensive wrap-up: summary, problem-solving practice, revision

Learning Resources:

Text Books:				
Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the Publisher	
Horowitz, Sahni, Rajasekaran	Computer Algorithms	2nd Edition	Universities Press	Download eBook
Cormen, Leiserson, Rivest, Stein	Introduction to Algorithms	4th Edition	MIT Press/McGraw-Hill	Download eBook
Reference Books:				
Aho, Hopcroft, Ullman	The Design and Analysis of Computer Algorithms	Addison Wesley	Aho, Hopcroft, Ullman	Download eBook

QUESTION PAPER PATTERN AND DATES

EXAMINATION	Dates	PART – A	PART – B	PART – C	TOTAL MARKS
Mid Term 1	August 11, 2025 to August 22, 2025	Attempt 5 out of 10 questions; Each question carries 2 marks (2×5)	Attempt 2 out of 4 questions; Each question carries 5 marks (5×2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10×1)	30

Mid Term 2	October 07, 2025 to October 17, 2025	Attempt 5 out of 10 questions; Each question carries 2 marks (2×5)	Attempt 2 out of 4 questions; Each question carries 5 marks (5×2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10×1)	30
End Semester Examination	November 17, 2025 to December 2, 2025	Attempt 10 out of 15 questions; Each question carries 2 marks (2×10)	Attempt 6 out of 9 questions; Each question carries 5 marks (5×6)	Attempt 5 out of 8 questions; Each question carries 10 marks (10×5)	100

Examination Rules & Regulations:

https://iemcollege-my.sharepoint.com/:b:/g/personal/iemcoe_office_iem_edu_in/EXrcoe3d6oxlogHKO074XeUBC9qm3XNaf_qUeSiVTNh5OQ?e=MMQn40



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Syllabus and Lesson Plan for BCA Admission Batch 2024

Subject Name: **Operating Systems**
Subject Code: **BCACC302**

Credit: 4

Lecture Hours: 40

Maximum: 100 marks (Internal: 30 marks; External: 70 marks)

List of Faculty Members handling the Subject –

1. Dr. Goldina Ghosh
2. Dr. Priti Deb

Pre-requisite: Proficiency in programming, data structures, computer architecture, and discrete mathematics.

Relevant Links:

1. Link for Study Material:

[BCACC302_Operating_System_Study_Material.pdf](#)

2. Link for Coursera Course:

<https://www.coursera.org/specializations/codio-introduction-operating-systems>

3. Link for LinkedIn Learning Course:

<https://www.linkedin.com/learning/iot-foundations-operating-systems-fundamentals/welcome?u=229219690>

4. Link for Infosys Springboard Course:

https://infyspringboard.onwingspan.com/web/en/login?ref=%2Fapp%2Ftoc%2Fflex_auth_0135015677134110729950%2Foverview

COURSE OBJECTIVES:

1. To deliver a detailed knowledge of integral software in a computer system –Operating System.
2. To understand the working of operating system as a Process manager and a Resource manager.
3. To familiarize the students with Process, Threads, Deadlock Handling and Memory management.
4. To describe the problem of Process Scheduling and Process Synchronization and its solution.

COURSE OUTCOMES:

CO1: Students will develop the concept in understanding the principles and tasks of operating systems.

CO2: They will be able to apply CPU scheduling algorithms to manage tasks and also learn the different concepts of deadlock handling.

CO3: They will also develop initiation into the process of applying memory management methods and allocation policies.

CO4: Finally the students will also have knowledge in file system management.

Module number	Topic	Sub-topics	Chapter Name and Book	Mapping with Industry and International Academia	Lecture Hours
1	Introduction Operating-System Structures Processes Threads	What is an Operating system, Mainframe system, Desktop system, Multiprocessor system, Distributed system, Clustered Systems, Real-time systems System Components, OS Services, System calls, System Programs, System Structure Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication, Communication in Client–Server Systems Overview, Multithreading Models, Threading Issues	Operating System Concepts, Silberschatz, Galvin, Gange, Wiley Publication (Chapter 1,Chapter 2,Chapter 3, Chapter 4)	International Academia: (https://ocw.mit.edu/courses/6-828-operating-system-engineering-fall-2012/) Industry Mapping: Docker, Microsoft Azure	12

2	CPU Scheduling Process Synchronization Deadlocks	Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Real-Time CPU Scheduling Background, Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock	Operating System Concepts, Silberschatz, Galvin, Gange, Wiley Publication (Chapter 5,Chapter 6,Chapter 7,Chapter 8)	International Standards: (https://ocw.mit.edu/courses/6-828-operating-system-engineering-fall-2012/) (https://ocw.mit.edu/courses/6-829-computer-networks-fall-2002/resources/10singlelink/) IndustryMapping: Docker, Microsoft Azure	14
3	Memory Management Virtual Memory Mass-Storage Structure	Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table, Segmentation with paging Background, Demand Paging, Page Replacement, Allocation of Frames, Thrashing Overview of Mass-Storage Structure, Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, RAID Structure	Operating System Concepts, Silberschatz, Galvin, Gange, Wiley Publication (Chapter 9,Chapter 10,Chapter 11,Chapter 12)	International Standards: (https://ocw.mit.edu/courses/6-828-operating-system-engineering-fall-2012/) Industry Mapping : AWS, VxWorks	16

4	File-System Interface	File Concept, Access Methods, Directory and Disk Structure, File-System Mounting, File Sharing, Protection	Operating System Concepts, Silberschatz, Galvin, Gange, Wiley Publication (Chapter 13,Chapter 14,Chapter 15)	International Standards: (https://ocw.mit.edu/courses/6-828-operating-system-engineering-fall-2012/)	6
	File-System Implementation	File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance			

Module 1: Introduction

2nd Year, Sec A (Faculty Name – Dr. Goldina Ghosh, Dr. Priti Deb)

2nd Year, Sec B (Faculty Name – Dr. Goldina Ghosh, Dr. Priti Deb)

2nd Year, Sec C (Faculty Name – Dr. Goldina Ghosh, Dr. Priti Deb)

Working Days	Lesson Plan Description
Day 1	Introduction to OS: What is an OS, Mainframe, Desktop systems
Day 2	Multiprocessor, Distributed, Clustered, Real-time systems
Day 3	System Components, OS Services
Day 4	System Calls, System Programs
Day 5	System Structure
Day 6	Process Concept
Day 7	Process Scheduling
Day 8	Operations on Processes
Day 9	Interprocess Communication
Day 10	Communication in Client–Server Systems
Day 11	Threads: Overview, Multithreading Models
Day 12	Threads: Threading Issues

Module 2: CPU Scheduling, Process Synchronization, Deadlocks

2nd Year, Sec A (Faculty Name – Dr. Goldina Ghosh, Dr. Priti Deb)

2nd Year, Sec B (Faculty Name – Dr. Goldina Ghosh, Dr. Priti Deb)

2nd Year, Sec C (Faculty Name – Dr. Goldina Ghosh, Dr. Priti Deb)

Working Days	Lesson Plan Description
Day 13	CPU Scheduling: Basic Concepts, Scheduling Criteria
Day 14	Scheduling Algorithms
Day 15	Multiple-Processor Scheduling
Day 16	Real-Time CPU Scheduling
Day 17	Process Synchronization: Background, Critical-Section Problem
Day 18	Peterson's Solution, Synchronization Hardware
Day 19	Mutex Locks, Semaphores
Day 20	Classic Problems of Synchronization
Day 21	Monitors
Day 22	Deadlocks: System Model, Deadlock Characterization
Day 23	Methods for Handling Deadlocks
Day 24	Deadlock Prevention, Deadlock Avoidance
Day 25	Deadlock Detection, Recovery from Deadlock
Day 26	Summary and Recap of Module 2

Module 3: Memory Management, Virtual Memory, Mass-Storage Structure

2nd Year, Sec A (Faculty Name – Dr. Goldina Ghosh, Dr. Priti Deb)

2nd Year, Sec B (Faculty Name – Dr. Goldina Ghosh, Dr. Priti Deb)

2nd Year, Sec C (Faculty Name – Dr. Goldina Ghosh, Dr. Priti Deb)

Working Days	Lesson Plan Description
Day 27	Memory Management: Background, Swapping
Day 28	Contiguous Memory Allocation
Day 29	Segmentation

Day 30	Paging
Day 31	Structure of the Page Table
Day 32	Segmentation with Paging
Day 33	Virtual Memory: Background, Demand Paging
Day 34	Page Replacement
Day 35	Allocation of Frames
Day 36	Thrashing
Day 37	Mass-Storage Structure: Overview, Disk Structure
Day 38	Disk Scheduling
Day 39	Disk Management
Day 40	Swap-Space Management
Day 41	RAID Structure
Day 42	Summary and Recap of Module 3

Module 4: File-System Interface and Implementation

2nd Year, Sec A (Faculty Name – Dr. Goldina Ghosh, Dr. Priti Deb)

2nd Year, Sec B (Faculty Name – Dr. Goldina Ghosh, Dr. Priti Deb)

2nd Year, Sec C (Faculty Name – Dr. Goldina Ghosh, Dr. Priti Deb)

Working Days	Lesson Plan Description
Day 43	File-System Interface: File Concept, Access Methods
Day 44	Directory and Disk Structure, File-System Mounting
Day 45	File Sharing, Protection
Day 46	File-System Implementation: Structure and Implementation
Day 47	Directory Implementation, Allocation Methods
Day 48	Free-Space Management, Efficiency, and Performance

TEXTBOOK:

1. **Operating System Concepts, Silberschatz, Galvin, Gange, Wiley Publication (Chapter -1,2,3,4,5,6,7,8,9,10,11,12,13,14,15)**

REFERENCEBOOKS:

1. **Operating Systems**, W. Stallings, Pearson Education

QUESTION PAPER PATTERN AND DATES

EXAMINATION	Dates	PART – A	PART – B	PART – C	TOTAL MARKS
Mid Term 1	August 11, 2025 to August 22, 2025	Attempt 5 out of 10 questions; Each question carries 2 marks (2×5)	Attempt 2 out of 4 questions; Each question carries 5 marks (5×2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10×1)	30
Mid Term 2	October 7, 2025 to October 17, 2025	Attempt 5 out of 10 questions; Each question carries 2 marks (2×5)	Attempt 2 out of 4 questions; Each question carries 5 marks (5×2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10×1)	30
End Semester Examination	November 17, 2025 to December 2, 2025	Attempt 10 out of 15 questions; Each question carries 2 marks (2×10)	Attempt 6 out of 9 questions; Each question carries 5 marks (5×6)	Attempt 5 out of 8 questions; Each question carries 10 marks (10×5)	100

Examination Rules & Regulations:

https://iemcollege-my.sharepoint.com/:b:/g/personal/iemcoe_office_iem_edu_in/EXrcoe3d6oxIogHKO074XeUBC9qm3XNaf_qUeSiVTNh5OQ?e=MMQn40



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Syllabus and Lesson Plan for BCA Admission Batch 2024

Subject Name: **Python Programming**

Credit: 4

Lecture Hours: 40

Subject Code: **BCACC303**

Maximum: 100 marks (Internal: 30 marks; External: 70 marks)

List of Faculty Members handling the Subject –

1. Prof. Pritam Chakraborty
2. Prof. Deepika Dalavi

Pre-requisite: Basics of programming language, Logic building skill, Problem solving.

Relevant Links:

1. Link for Study Material:

https://drive.google.com/file/d/1vL_xuhIYKqr7EhYudpAfm4-zl9MCltoY/view?usp=sharing/

2. Link for Coursera Course:

[Python 3 Programming | Coursera](#)

3. Link for LinkedIn Learning Course:

[Python Object-Oriented Programming Online Class | LinkedIn Learning, formerly Lynda.com](#)

4. Link for SWAYAM Course:

https://onlinecourses.swayam2.ac.in/aic20_sp33/

COURSE OBJECTIVES:

Throughout the course, students will be expected to demonstrate their understanding of Python Programming by being able to do each of the following:

1. To apply fundamental concepts of Python Programming for problem solving
2. To understand the fundamentals different data types, operators and conditional operators in python.
3. To understand and apply and work with string, list, tuple and dictionary.
4. To apply logical reasoning to design programs using object oriented programing and use python modules and packages.

COURSE OUTCOMES:

CO1: Understand the importance and basic concepts of Python Programming and be able to apply them in problem solving

CO2: To understand basic concepts of flow control statements and concept of iterators and able to apply flow control statements to solve problems

CO3: To get familiarize and understand basic set and dictionary operations and be able to apply the concept for solving real word problems

CO4: Understand some basic properties of object oriented programming in python, and be able to analyze practical examples.

Module number	Topic	Sub-Topics	Chapter Name	Mapping with Industry and International Academia	Lecture Hours	Corresponding Lab
1	Introduction to Python Programming	Introduction to Python Programming: Python variables, expressions, statements Variables, Keywords, Operators & operands, Expressions, Statements, Order of operations, String operations, Comments, Keyboard input, Example programs. Functions Type conversion function, Math functions,	Python Programming, S.SRIDHAR, J INDUMATI VM HARIHARAN Chapter No : 3 Python Programming Problem Solving, Packages and Libraries, Anurag Gupta & G.P Biswas Chapter No :2	International Standards: https://ocw.mit.edu/courses/6-0001-introduction-to-computer-science-and-programming-in-python-fall-2016/resources/lecture-1-what-is-computation/ Industry Mapping: TensorFlow PyTorch: scikit-learn: NumPy and ,Pandas, Generative Adversarial Networks (GAN)	10	Write an algorithm for swapping two variables without a 1. a = a + b 2. b = a - b 3. a = a - b At step 2 and step 3, one could notice that the values in a intermediate variable. Write an algorithm for finding a number prime or not. Input: n, number Output: True (If n is prime number) or False (If n is not p if n < 2: return False if n = 2 or 3: return True if n % 2 == 0 or n%3 == 0: return False for i ∈ [5, √n] do: if i % 2 != 0: if n % i == 0: return False Read a set of employees and their year of birth. Write an employees who were born in odd years. 1. Read in the set of employees and their year of bir 2. For each employee, check if their birth year is od 3. If the birth year is odd, print the employee's name

		Composition of functions, Defining own function, parameters, arguments, Importing functions, Example programs				Write an algorithm to check the number Armstrong number. <pre> sum = 0 num_digits = len(str(n)) for digit in str(n): sum += int(digit) ** num_digits if sum == n: return True else: return False </pre> Write an algorithm to solve the Towers of Hanoi problem. 1. If there is only one disk, move it from the source rod to the destination rod. 2. Otherwise, move n-1 disks from the source rod to the auxiliary rod as the destination rod as the auxiliary. 3. Move the remaining disk from the source rod to the destination rod. 4. Move the n-1 disks from the auxiliary rod to the destination rod as the auxiliary. Write a recursive algorithm to find the sum of an array. <pre> def array_sum(arr, index): if index < 0: return 0 return arr[index] + array_sum(arr, index - 1) </pre> Write an algorithm for solving a binary search problem. <pre> def binary_search(arr, value, first, last): if first > last: return -1 middle = (first + last) // 2 if arr[middle] == value: return middle elif arr[middle] > value: return binary_search(arr, value, first, middle - 1) else: return binary_search(arr, value, middle + 1, last) </pre> Write an algorithm to solve a cashier problem. A cashier has a list of the denominations of the coins available with him. The cashier has to find the minimum number of coins for a given request. <pre> def minimum_coins(total_amount, denominations): </pre>
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						coin_counts = [0] * len(denominations) denominations.sort(reverse=True) for i in range(len(denominations)): num_coins = total_amount // denominations[i] coin_counts[i] = num_coins total_amount -= denominations[i] * num_coins if total_amount == 0: return coin_counts return "Not possible with the given values"
						Write an algorithm for finding a perfect number.
						Solve the $3n + 1$ problem to generate a sequence of numbers

2	Control flow, Iterators & Functions	Control flow, Iterators: Conditions and iterations Modulus operator, Boolean expression, Logical operators, if, if-else, if-elif-else, Nested conditions, Example programs Iteration while, for, break, continue, Nested loop, Example programs Function :Function Definition, Call, Signature, Function Python Recursive Function	Python Programming, S.SRIDHAR, J INDUMATI VM HARIHARAN Chapter No: 4,5,6 Python Programming Problem Solving, Packages and Libraries, Anurag Gupta & G.P Biswas Chapter No :4,5	International Standards: 1.https://ocw.mit.edu/course/s/6-0001-introduction-to-computer-science-and-programming-in-python-fall-2016/resources/lecture-2-branching-and-iteration/ 2.https://ocw.mit.edu/course/s/6-0001-introduction-to-computer-science-and-programming-in-python-fall-2016/resources/lecture-4-decomposition-abstraction-and-functions/ Industry Mapping TensorFlow PyTorch: scikit-learn: NumPy and ,Pandas Jupyter Notebooks , Prompt Engineering	10	<table><tr><td>Write a python program to find the roots of a quadratic equation</td></tr><tr><td>Write a program to find whether the given number is odd or negative.</td></tr><tr><td>Write a program to calculate bonuses for employees based on (Given name, grade, basic pay, dearness allowance, HRA)</td></tr><tr><td>Write a program to display the day's name, given the date</td></tr><tr><td>Check if a Number is Even or Odd using if-else Find the Largest of Three Numbers using if-elif-else Check Whether a Year is Leap Year using Nested Conditions Print All Prime Numbers up to N using for loop and condition Calculate Factorial using while loop . Multiplication Table using Nested for Loops Print Fibonacci Series using Iteration (Loop) Function to Check if a Number is Positive, Negative or Zero Recursive Function to Calculate Factorial of a Number Recursive Function to Generate Fibonacci Series up to N</td></tr><tr><td></td></tr><tr><td></td></tr><tr><td></td></tr></table>	Write a python program to find the roots of a quadratic equation	Write a program to find whether the given number is odd or negative.	Write a program to calculate bonuses for employees based on (Given name, grade, basic pay, dearness allowance, HRA)	Write a program to display the day's name, given the date	Check if a Number is Even or Odd using if-else Find the Largest of Three Numbers using if-elif-else Check Whether a Year is Leap Year using Nested Conditions Print All Prime Numbers up to N using for loop and condition Calculate Factorial using while loop . Multiplication Table using Nested for Loops Print Fibonacci Series using Iteration (Loop) Function to Check if a Number is Positive, Negative or Zero Recursive Function to Calculate Factorial of a Number Recursive Function to Generate Fibonacci Series up to N			
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3	Strings, List, Dictionaries, Tuples	Strings: Accessing values in string, Updating strings, Slicing strings, String methods – upper(), find(), lower(), capitalize(), count(), join(), len(), isalnum(), isalpha(), isdigit(), islower(), isnumeric(), isspace(), isupper() max(), min(), replace(), split(), Example programs List: Introduction, Traversal, Operations, Slice, Methods, Delete element, Difference between lists and strings, Example program Dictionaries : Introduction,	Python Programming, S.SRIDHAR, J INDUMATI VM HARIHARAN Chapter No: 7,8,9 Python Programming Problem Solving, Packages and Libraries, Anurag Gupta & G.P Biswas Chapter No :7,8,9,10	International Standard: 1. https://ocw.mit.edu/courses/6-0001-introduction-to-computer-science-and-programming-in-python-fall-2016/resources/lecture-3-string-manipulation-guess-and-check-approximations-bisection/ 2. https://ocw.mit.edu/courses/6-0001-introduction-to-computer-science-and-programming-in-python-fall-2016/resources/lecture-5-tuples-lists-aliasing-mutability-and-cloning/ Industry mapping: Django and Flask. FastAPI, Selenium Ansible, Docker,Fabric Kubernetes, NLP	10	<table><tr><td>Input a string and print the first, last, and sliced part (e.g., [1</td></tr><tr><td>Apply various string methods on an input sentence and displ</td></tr><tr><td>Accept a string and check its various properties using valida</td></tr><tr><td>Join a list of strings with a separator and display the total len</td></tr><tr><td>Display the maximum and minimum characters in a string p</td></tr><tr><td>Create a list, access items, update, slice, and delete specific</td></tr><tr><td>Show difference in mutability, slicing, and element-wise op</td></tr><tr><td>Input student data (name: marks), then retrieve marks using</td></tr><tr><td>Create a list and tuple, attempt mutation on both, and show c</td></tr><tr><td>Create a dictionary where keys/values are tuples and demon</td></tr></table>	Input a string and print the first, last, and sliced part (e.g., [1	Apply various string methods on an input sentence and displ	Accept a string and check its various properties using valida	Join a list of strings with a separator and display the total len	Display the maximum and minimum characters in a string p	Create a list, access items, update, slice, and delete specific	Show difference in mutability, slicing, and element-wise op	Input student data (name: marks), then retrieve marks using	Create a list and tuple, attempt mutation on both, and show c	Create a dictionary where keys/values are tuples and demon
Input a string and print the first, last, and sliced part (e.g., [1																
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Input student data (name: marks), then retrieve marks using																
Create a list and tuple, attempt mutation on both, and show c																
Create a dictionary where keys/values are tuples and demon																

		Brief idea of dictionaries & lists Tuples: Introduction, Brief idea of lists & tuples, Brief idea of dictionaries & tuples				
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4	Modules, Packages, Object Oriented Programming	Python Modules, Python Packages, Creating class, Instance objects, Accessing attributes, Built in class attributes, destroying objects, Inheritance, Abstraction, Polymorphism Example program	Python Programming, S.SRIDHAR, JNDUMATI VM HARIHARAN apter No 12, 15 Python Programming Problem Solving, Packages and libraries, Anurag Gupta & G.P Biswas Chapter No :13	International Standard: 1. https://ocw.mit.edu/courses/6-0001-introduction-to-computer-science-and-programming-in-python-fall-2016/resources/lecture-8-object-oriented-programming/ Industry mapping: Apache Spark: PySpark. Apache Airflow: Apache Kafka	10	1. Write a Python program to create a class Student with name and marks. Include a method to display the student's details.
						2. Create a class BankAccount with deposit, withdraw, and display methods. Implement encapsulation to protect balance.
						3. Write a Python program to implement inheritance with classes Employee and Manager. Override the constructor and display method.
						4. Create a class Product with a class variable to count the number of objects created. Include a static method to display the count.
						5. Implement a class Calculator that demonstrates method overloading using default arguments in Python.

Module 1: Introduction to Python Programming

2nd Year, Sec A (Faculty Name - Prof. Pritam Chakraborty, Prof Deepika Dalavi)

2nd Year, Sec B (Faculty Name – Prof. Pritam Chakraborty, Prof Deepika Dalavi)

2nd Year, Sec C (Faculty Name – Prof. Pritam Chakraborty, Prof Deepika Dalavi)

Working Days	Lesson Plan Description
Day 1	Introduction to Python – History, Features, Installing Python, Writing and Running First Program
Day 2	Understanding Python Variables – Data types, Variable declaration, Naming rules
Day 3	Keywords, Operators & Operands – Arithmetic, Relational, Logical, Assignment operators
Day 4	Expressions and Statements – Difference, Examples, Expression Evaluation
Day 5	Order of Operations – Operator precedence, Associativity, Nested expressions
Day 6	String Operations – Concatenation, Repetition, Indexing, Slicing, Escape characters
Day 7	String Methods – upper(), lower(), capitalize(), find(), replace(), split(), join(), len()
Day 8	String Validations – isalpha(), isdigit(), isspace(), isalnum(), isupper(), islower()
Day 9	Input and Output – Using input(), print(), formatted strings, comments
Day 10	Type Conversion Functions – int(), float(), str(), eval()
Day 11	Math Functions and Composition – math module, sqrt(), pow(), ceil(), nesting functions
Day 12	Defining and Calling Functions – def, parameters, return values, importing modules, example programs

Module 2: Control flow, Iterators & Functions

2nd Year, Sec A (Faculty Name - Prof. Pritam Chakraborty, Prof Deepika Dalavi)

2nd Year, Sec B (Faculty Name – Prof. Pritam Chakraborty, Prof Deepika Dalavi)

2nd Year, Sec C (Faculty Name – Prof. Pritam Chakraborty, Prof Deepika Dalavi)

Working Days	Lesson Plan Description
Day 13	Introduction to Control Flow – Boolean expressions and Logical Operators (and, or, not)
Day 14	Using if and if-else statements – Syntax, Flowcharts, and Simple Conditions
Day 15	Nested if and if-elif-else – Multiple condition checking with examples
Day 16	Introduction to Loops – Difference between for and while loops
Day 17	while Loop – Syntax, Flow, Condition-based Iteration, Infinite loop prevention
Day 18	for Loop – Iterating over strings, lists, and range()
Day 19	Loop Control Statements – break, continue, pass with nested loops
Day 20	Nested Loops – Pattern printing and matrix traversal
Day 21	Introduction to Functions – Defining and calling functions, return values
Day 22	Parameters and Arguments – Positional, Default, and Keyword arguments
Day 23	Function Composition and Reusability – Using one function inside another
Day 24	Recursive Functions – Concept, writing factorial & Fibonacci recursively with base conditions
Day 25	Class open book test on module 2

Day 26	Summary and Recap of Module 2
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Module 3: Strings, List, Dictionaries, Tuples

2nd Year, Sec A (Faculty Name - Prof. Pritam Chakraborty, Prof Deepika Dalavi)

2nd Year, Sec B (Faculty Name – Prof. Pritam Chakraborty, Prof Deepika Dalavi)

2nd Year, Sec C (Faculty Name – Prof. Pritam Chakraborty, Prof Deepika Dalavi)

Working Days	Lesson Plan Description
Day 27	Introduction to Strings – Definition, indexing, and string literals
Day 28	String Slicing and Concatenation – Accessing substrings, slicing, combining strings
Day 29	String Methods – upper(), lower(), capitalize(), find(), replace()
Day 30	String Functions – len(), count(), join(), split()
Day 31	String Validation Methods – isalnum(), isalpha(), isdigit(), isspace(), islower(), isupper()
Day 32	Introduction to Lists – Definition, creation, indexing, and traversal
Day 33	List Slicing, Nested Lists and Updating Elements
Day 34	List Operations – append(), extend(), insert(), remove(), pop(), del
Day 35	Built-in List Functions – len(), max(), min(), sum(), sort(), reverse()
Day 36	Difference Between Strings and Lists – Mutability, iteration, slicing
Day 37	Introduction to Dictionaries – Key-value pairs, creating and accessing values
Day 38	Dictionary Methods – keys(), values(), items(), get(), update(), pop()
Day 39	Introduction to Tuples – Creating tuples, accessing elements, immutability
Day 40	Tuple Operations – Indexing, slicing, built-in functions, tuple packing/unpacking
Day 41	Difference Between Tuples, Lists, and Dictionaries – Summary comparison, use cases
Day 42	Summary and Recap of Module 3

Module 4: Modules, Packages, Object Oriented Programming

2nd Year, Sec A (Faculty Name - Prof. Pritam Chakraborty, Prof Deepika Dalavi)

2nd Year, Sec B (Faculty Name – Prof. Pritam Chakraborty, Prof Deepika Dalavi)

2nd Year, Sec C (Faculty Name – Prof. Pritam Chakraborty, Prof Deepika Dalavi)

Working Days	Lesson Plan Description
Day 43	Introduction to Modules – Importing built-in and user-defined modules, import, from...import
Day 44	Creating and Using Packages – __init__.py, directory structure, importing from packages
Day 45	Introduction to OOP – Class, Object, __init__() constructor, instance variables and methods
Day 46	Encapsulation and Class-Level Features – Private attributes, class variables, static methods
Day 47	Inheritance – Single and multilevel inheritance, super() method, method overriding
Day 48	Polymorphism and Object-Oriented Design – Duck typing, function overloading via default args

TEXTBOOK:

1. **S.SRIDHAR, J INDUMATI VM HARIHARAN, Python Programming, PEARSON. ISBN 978-93-560-6933-6**
2. **Python Programming Problem Solving, Packages and Libraries, Anurag Gupta & G.P Biswas. Tata MgrawHill ISBN-13: 978-93-5316-800-1**

REFERENCEBOOKS:

1. **Veena Ghuriani, Akansha Gautam, Vaishali Chawla, Python Programming, A comprehensive Approach, PHI/Pearson Education, Fourth Edition**
2. **Kenneth A Lambert, Fundamentals of Python, First Programs, 2nd Edition**

QUESTION PAPER PATTERN AND DATES

EXAMINATION	Dates	PART – A	PART – B	PART – C	TOTAL MARKS
Mid Term 1	August 11, 2025 to August 22, 2025	Attempt 5 out of 10 questions; Each question carries 2 marks (2×5)	Attempt 2 out of 4 questions; Each question carries 5 marks (5×2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10×1)	30
Mid Term 2	October 7, 2025 to October 17, 2025	Attempt 5 out of 10 questions; Each question carries 2 marks (2×5)	Attempt 2 out of 4 questions; Each question carries 5 marks (5×2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10×1)	30
End Semester Examination	November 17, 2025 to December 2, 2025	Attempt 10 out of 15 questions; Each question carries 2 marks (2×10)	Attempt 6 out of 9 questions; Each question carries 5 marks (5×6)	Attempt 5 out of 8 questions; Each question carries 10 marks (10×5)	100

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University of Engineering and Management
Institute of Engineering & Management, Salt Lake Campus
Institute of Engineering & Management, New Town Campus
University of Engineering & Management, Jaipur



Syllabus and Lesson Plan for BCA Admission Batch 2024

Subject Name: **Environmental Studies**

Credit: 4

Lecture Hours: 40

Subject Code: **BCAAE301**

Maximum: 100 marks (Internal: 30 marks; External: 70 marks)

List of Faculty Members handling the Subject –

1. Phani Bhushan Ghosh

Pre-requisite: Knowledge of Class X standards of Biology, Chemistry.

Relevant Links:

1. Link for Study Material:

<https://drive.google.com/drive/folders/1P8DQjYgpQWxzS1xh7IJSoeNEG0RZLdVN?usp=sharing>

2. Link for Coursera Course:

<https://www.coursera.org/learn/sustainability>

<https://www.coursera.org/learn/global-environmental-management>

<https://www.coursera.org/learn/environmental-science>

3. Link for LinkedIn Learning Course:

<https://www.linkedin.com/learning/introduction-to-esg-environmental-social-and-governance>

<https://www.linkedin.com/learning/climate-change-a-top-esg-concern>

COURSE OBJECTIVES:

1. To create awareness about environmental issues.
2. To nurture the curiosity of students particularly in relation to natural environment.
3. To develop an attitude among students to actively participate in all the activities regarding environment protection
4. To develop an attitude among students to actively participate in all the activities regarding environment protection

COURSE OUTCOMES:

CO1: To enable critical thinking in relation to environmental affairs and recall the terms involved in pollution.

CO2: Understand the different sources and effects of air pollution.

CO3: Understand various sources, types of pollutants causing water pollution.

CO4: Know Soil, Noise, Thermal and Radioactive Pollutants and their effects. Study of various pollution control measures.

Module number	Topic	Sub-topics	Chapter Name and Book	Mapping with Industry and International Academia	Lecture Hours
1	Environment	Environmental science, Environmental segment, Nomenclature, Basic concept related to environmental perspective, Objective of environmental education Mathematics of population growth, Environmental degradation, Acid rain, Toxic Elements, Particulates, Pollution prevention, Environmental problems and sustainable development, Environmental impact assessment	Basic Environmental Engineering and Elementary Biology, Gourikrishna Dasmohapatra (Chapter 1) Dr. Debapriya De & Dr. Debashish De, Fundamentals of Environment & Ecology (Chapter 1)	International Academia: https://ocw.mit.edu/collections/environment/ Industry Mapping: The Energy and Resources Institute (TERI), Centre for Science and Environment (CSE), and the National Environmental Engineering Research Institute (NEERI)	6

2	Air, Water & Land Pollution	Atmosphere structure, Earth's radiation balance, Global atmospheric change Green House effect, Global warming and its consequences, Atmospheric stability, Atmospheric dispersion, Stack and Plume, Temperature inversion Chlorofluorocarbons, Ozone, Toxic chemical in the environment, Carbon monoxide (CO), Sulphur dioxide, oxides of Nitrogen, Smog, Control of air pollution, Hydrosphere, hydrological cycle, pollutants in water, biochemical oxygen demand (BOD), Chemical oxygen demand (COD), Oil pollution in marine environment, Water quality, Eutrophication, Ground Water, Hydraulic gradients, Darcy's Law, Flow Velocity, Water treatment Operation, Hardness of water, Lithosphere, Solid waste pollution, Classification of solid wastes, Solid waste Management, Hazardous wastes, Hazardous waste management, Soil.	Basic Environmental Engineering and Elementary Biology, Gourikrishna Dasmohapatra (Chapter 4,5,6) Dr. Debapriya De & Dr. Debashish De, Fundamentals of Environment & Ecology (Chapter 2,3,5)	International Academia: https://ocw.mit.edu/collections/environment/ Industry Mapping: The Energy and Resources Institute (TERI), Centre for Science and Environment (CSE), and the National	14
3	Ecology	Ecology, Classification of Ecology, Ecological pyramids, Components of Ecosystem, Food chain, Food Web, Types of Food chain, Biogeochemical cycles	Basic Environmental Engineering and Elementary Biology, Gourikrishna Dasmohapatra (Chapter 2,3) Dr. Debapriya De & Dr. Debashish De, Fundamentals of Environment & Ecology (Chapter 4)	International Academia: https://ocw.mit.edu/collections/environment/ Industry Mapping: The Energy and Resources Institute (TERI), Centre for Science and Environment (CSE), and the National	10

4	Noise Pollution and Control	Sound and its general features, Measurement of noise level, Noise classification, Noise measurements, Harmful effects of noise pollution	Basic Environmental Engineering and Elementary Biology, Gourikrishna Dasmohapatra (Chapter 7) Dr. Debapriya De & Dr. Debashish De, Fundamentals of Environment & Ecology (Chapter 6)	International Academia: https://ocw.mit.edu/collections/environment/ Industry Mapping: The Energy and Resources Institute (TERI), Centre for Science and Environment (CSE), and the National	10
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Module 1: Environment

2nd Year, Sec A,B,C (Faculty Name – Phani Bhushan Ghosh)

Working Days	Lesson Plan Description
Day 1	Environmental science, Environmental segment, Nomenclature
Day 2	Basic concept related to environmental perspective, Objective of environmental education Mathematics of population growth
Day 3	Environmental degradation, Acid rain, Toxic Elements, Particulates,
Day 4	Pollution prevention, Environmental problems
Day 5	Atmosphere structure, Earth's radiation balance,
Day 6	Global atmospheric change, Green House effect,
Day 7	Global warming and its consequences

Module 2: Air, Water & Land Pollution

2nd Year, Sec A,B,C (Faculty Name – Phani Bhushan Ghosh)

Working Days	Lesson Plan Description
Day 8	Atmospheric stability, Atmospheric dispersion, , Hazardous waste management, Soil

Day 9	Stack and Plume, Temperature inversion Chlorofluorocarbons, Ozone, Toxic chemical in the environment
Day 10	Carbon monoxide (CO), Sulphur dioxide, oxides of Nitrogen, Smog, Control of air pollution
Day 11	Hydrosphere, hydrological cycle, pollutants in water, biochemical oxygen demand (BOD),
Day 12	Chemical oxygen demand (COD), Oil pollution in marine environment,
Day 13	Water quality, Eutrophication, Ground Water, Hydraulic gradients, Darcy's Law,
Day 14	Flow Velocity, Water treatment Operation, Hardness of water,
Day 15	Lithosphere, Solid waste pollution,
Day 16	Classification of solid wastes, Solid waste Management, Hazardous wastes
Day 17	Soil

Module 3: Ecology

2nd Year, Sec A,B,C (Faculty Name – Phani Bhushan Ghosh)

Working Days	Lesson Plan Description
Day 18	Ecology, Classification of Ecology, , ,
Day 19	Classification of Ecology, Ecological pyramids
Day 20	Ecological pyramids, Components of Ecosystem
Day 21	Components of Ecosystem
Day 22	Food chain, Types of Food chain
Day 23	Food chain, Types of Food chain
Day 24	Food Web
Day 25	Food Web, Biogeochemical cycles
Day 26	Biogeochemical cycles

Module 4: Noise Pollution and Control

2nd Year, Sec A,B,C (Faculty Name – Phani Bhushan Ghosh)

Working Days	Lesson Plan Description
Day 27	Sound and its general features
Day 28	Sound and its general features
Day 29	Measurement of noise level
Day 30	Measurement of noise level, Noise classification,
Day 31	Noise classification, Noise measurements, Harmful effects of noise pollution
Day 32	Noise classification, Noise measurements, Harmful effects of noise pollution
Day 33	Noise classification, Noise measurements, Harmful effects of noise pollution
Day 34	Noise classification, Noise measurements, Harmful effects of noise pollution
Day 35	Noise measurements , Harmful effects of noise pollution
Day 36	Revision
Day 37	Revision
Day 38	Revision

TEXTBOOK:

1. Gourikrishna Dasmohapatra, Basic Environmental Engineering and Elementary Biology, 2nd Edition, Vikas
2. Dr. Debapriya De & Dr. Debashish De, Fundamentals of Environment & Ecology, 1st edition, S.Chand

REFERENCEBOOKS:

1. Arvind Walia, Environment and Ecology, Kalyani Publishers, 2010

QUESTION PAPER PATTERN AND DATES

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University of Engineering and Management
Institute of Engineering & Management, Salt Lake Campus
Institute of Engineering & Management, New Town Campus
University of Engineering & Management, Jaipur



Syllabus and Lesson Plan for BCA Admission Batch 2024

Subject Name **Business Ethics & Corporate Governance**
Subject Code: **BCAAE381**

Credit: 2

Lecture Hours: **36**

Maximum: 100 marks

List of Faculty Member handling the Subject –

1. Prof. Shramana Dutta

Pre-requisite: Fundamentals of Ethics and Corporate Governance.

Relevant Links:

1. Link for Study Material:

<https://drive.google.com/file/d/1Cw56svcYFV1tgTJWPAPuivevWqogrWaV/view?usp=sharing>

2. Link for Coursera Course:

<https://www.coursera.org/learn/ethics-culture-and-global-perspectives>

3. Link for LinkedIn Learning Course:

<https://www.linkedin.com/learning/business-ethics>

4. NPTEL:

<https://archive.nptel.ac.in/courses/110/105/110105079/>

COURSE OBJECTIVES:

1. Promote understanding of the importance, for business and the community, of ethical conduct;
2. To develop various corporate social Responsibilities and practice in their professional
3. life Enhance awareness and critical self-examination of one's own values, and to appreciate the relevance of personal values in the business/workplace setting; and
4. Encourage reflection on the ethical dimension of your own decision-making in workplace and other settings.

COURSE OUTCOMES:

CO1: Students will be able to understand the business ethics.

CO2: The student will be able to analyze various ethical codes in corporate governance.

CO3: Comprehend the relationship between ethics, morals and values in the workplace.

CO4: Understand the definition of ethics and the importance and role of ethical behavior in the business world today.

Module No	Topic	Sub Topic	Mapping with Industry and International Academia	Lecture Hours	Activities & Assignment
MODULE 1	Introduction: Business Ethics	1.Business Ethics: 1.1 Introduction & Definition- Ethics 1.2 Objectives, Nature, Scope & Purpose 1.3 Characteristics 1.4 Principles.	International Academia: https://ocw.mit.edu/courses/24-231-ethics-fall-2009/ Industry Mapping: Situational Analysis and Role Play	9	Report Writing
MODULE 2	Ethics and Business System	2. Relationship between Ethics and Business: 2.1 Ethical Organization 2.2 Characteristics of Ethical Organization 2.3 Need for Business Ethics 2.4 Ethical leadership 2.5 SWOT Analysis 2.6 Social Responsibilities of Business.	International Academia: https://ocw.mit.edu/courses/15-270-ethical-practice-leading-through-professionalism-social-responsibility-and-system-design-spring-2016/ Industry Mapping: Industry Role Play	10	Group Interaction

MODULE 3	Management of Personal Life & Environmental Ethics	3. Personal Life-Introduction: 3.1 Professional Life v/s Family Life 3.2 Ethics and Happy Home 3.3 Strategy for Stress Management Environmental Ethics 3.4 Gender Ethics Corruption and Gender Issues 3.5 Balanced Global Environment- i. Balanced Global Environment, ii. Kyoto Protocol.	International Academia: https://ocw.mit.edu/courses/pe-550-designing-your-life-january-iap-2007/ Industry Mapping: Case Study Related to Actual Industry Scenario	9	Presentation Activity
MODULE 4	Corporate Governance	4. Corporate Governance & Code of Corporate Practices: 4.1 Types & Principles 4.2 5 P's & 4 C's & Gandhian Approach 4.3 Social Responsibility of Corporate 4.4 Role of Board of Directors (BOD) 4.5 Corporate Culture.	International Academia: https://ocw.mit.edu/courses/15-224-global-markets-national-politics-and-the-competitive-advantage-of-firms-spring-2003/ Industry Mapping: Industry Role Play	8	Case Study

Module 1: Introduction: Business Ethics

2nd Year, Sec A, B, C (Faculty Name – Prof. Shramana Dutta)

Working Days	Lesson Plan Description
Day 1	Business Ethics
Day 2	Introduction & Definition- Ethics
Day 3	Objectives
Day 4	Nature, Scope & Purpose
Day 5	Principles
Day 6	Ethics and conclusion

Module 2: Ethics and Business System

2nd Year, Sec A, B, C (Faculty Name – Prof. Shramana Dutta)

Working Days	Lesson Plan Description
Day 7	Relationship between Ethics and Business
Day 8	Ethical Organization

Day 9	Characteristics of Ethical Organization
Day 10	Need for Business Ethics
Day 11	Ethical leadership
Day 12	SWOT Analysis
Day 14	Case Study
Day 15	Social Responsibilities of Business

Module 3: Management of Personal Life & Environmental Ethics

2nd Year, Sec A, B, C (Faculty Name – Prof. Shramana Dutta)

Working Days	Lesson Plan Description
Day 16	Personal Life-Introduction
Day 17	Professional Life v/s Family Life
Day 18	Ethics and Happy Home
Day 19	Strategy for Stress Management Environmental Ethics
Day 20	Gender Ethics Corruption and Gender Issues
Day 21	Balanced Global Environment
Day 22	Kyoto Protocol
Day 23	Ethics and Gender Issues
Day 24	Ethics and Management

Module 4: Corporate Governance

2nd Year, Sec A, B, C (Faculty Name – Prof. Shramana Dutta)

Working Days	Lesson Plan Description
Day 25	Corporate Governance
Day 26	Code of Corporate Practices
Day 27	Types
Day 28	Principles
Day 29	2 5 P's & 4 C's
Day 30	Gandhian Approach
Day 31	Core Principles of Gandhian Approach

Day 32	Social Responsibilities of Corporates
Day 33	Types of CSR
Day 34	Social Responsibility of Corporate
Day 35	Role of Board of Directors
Day 36	Corporate Culture

REFERENCE BOOKS:

1. **Values & Ethics of Profession & Business** by S. K. Sarangi; Asian Books Private Limited.

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