

	Lokmanya Tilak Jankalyan Shikshan Sanstha's PRIYADARSHINI BHAGWATI COLLEGE OF ENGINEERING An Autonomous Institute Affiliated to RTM, Nagpur University, Nagpur Accredited with Grade "A" by NAAC Harpur Nagar, Umred Road (Near Bada Tajbagh), Nagpur – 440 024 Tel: +91-712-2710281,2710282; Fax: 91-712-2710283 Email: - principalpbcoe@gmail.com website: -www.pbcoe.edu.in	
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Scheme of Teaching, Examination & Evaluation

B. Tech. III Semester Computer Science & Engineering (A Four-Year Degree Programme)

Sr. No.	Category	Course Code	Course Name	Hours/Week			Credits	Maximum Marks			Min. Passing Marks			ESE Duration (Hrs.)
				L	T/A	P		Continuous Evaluation	End Sem Exam	Total	Continuous Evaluation	End Sem Exam	Total	
1	PCC	CSE301T	Data Structure	3	--	0	3	40	60	100	--	15	45	3
2	PCC	CSE301P	Data Structure Lab	--	--	2	1	25	25	50	--	--	25	--
3	PCC	CSE302T	Introduction to Python Programming	3	--	0	3	40	60	100	--	15	45	3
4	PCC	CSE302P	Introduction to Python Programming Lab	--	--	2	1	25	25	50	--	--	25	--
5	MD M	CSAI303T	Multidisciplinary Minor	2	--	0	2	20	30	50	--	8	23	2
6	OE	CSAI304T	Open Elective – I	3	--	0	3	40	60	100	--	15	45	3
7	OE	CSAI304P	Open Elective – I	--	--	2	1	25	25	50	--	--	25	--
8	HSSM	HUT305T	Engineering Economics	2	--	--	2	20	30	50	--	8	23	2
9	HSSM (VEC)	HUT306T	Environmental Science	2	--	--	2	20	30	50	--	8	23	2
10	ELC (CEP/FP)	CSE307P	Internship / Field Project	--	--	4	2	50	50	100	--	--	45	--
Total				15	--	10	20	305	395	700	--	--	--	--

L – Lecture, P – Practical (Half Credit/Hour), T- Tutorial, A – Activity

Internship: -Evaluation of marks for internship will be given after successfully completion of internship-based activity and report submission.

Multidisciplinary Minor			
Sr. No.	Category	Course Code	Course Name
1	MDM	CSAI303T	Basic of Operating System

Open Elective – I			
Sr. No.	Category	Course Code	Course Name
1	OE	CSAI304T	Introduction to Python Programming
		CSAI304P	Introduction to Python Programming Lab

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
FOUR YEAR BACHELOR OF TECHNOLOGY (B.TECH.) DEGREE PROGRAMME
YEAR / SEMESTER: II / III

Course Code	Course Name	Hours/Week			Credits	Maximum Marks			ESE Duration (Hrs.)
		L	T	P		Continuous Evaluation	End Sem Exam	Total	
CSE301T	Data Structure	3	--	--	3	40	60	100	3

Prerequisite(s): C Language

Course Objectives:

1.	To introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms.
2.	To learn data structure Algorithms by using Programming Language.
3.	To select an appropriate data structure to solve real world problem and compare alternative implementations of data structures with respect to performance.

Course Outcomes:

At the end of this course, students will be able to

CO1	Understand the concept of data structure and various searching, sorting techniques.
CO2	Apply the concept of stack and queues to solve real world problem.
CO3	Describe and implement linked list operation.
CO4	Demonstrate different methods for traversing trees.
CO5	Utilize the concepts of graphs to build solution.

Unit I: Introduction to algorithm**[10 Hours] [12 Marks]**

Introduction to algorithm: General concepts of data structures, Types of Data Structure with its properties and Operations, Time and space analysis of algorithms, Big oh, theta, and omega notations, Average, best and worst case analysis. Sorting and Searching Techniques: Selection sort, insertion sort, heap sort, shell sort, linear and binary search.

Unit II: Stack & Queue**[10 Hours][12 Marks]**

Stack & Queue: Representation of Stack & queue using array, Application of stacks, Conversion from infix to postfix and prefix expressions, Evaluation of postfix expression using stacks, Linear Queues, Circular Queues, and Priority Queues.

Unit III: Linked List**[10 Hours][12 Marks]**

Linked List: Representation of ordered list using array and its operation, Linked Lists, singly linked list, Implementation of linked list using static and dynamic memory allocation, operations on linked list, polynomial representations using linked list, circular linked list, doubly linked list.

Unit IV: Trees**[9 Hours][12 Marks]**

General and binary trees, Representations and traversals of trees, Binary search trees, Threaded Binary Trees, Binary search trees, the concept of balancing, AVL Trees, B-Trees, B+ Trees.

Unit V: Graphs and Hashing**[9 Hours][12 Marks]**

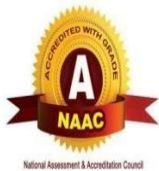
Representation of Graph, Matrix Representation of Graph, List Representation of Graph, Directed Graphs (Digraphs), Breadth first search and Depth first search, spanning trees, Hash tables, hash functions, hashing techniques, Collision resolution techniques, overflow handling.

Text Books:

1. “Classical Data Structure”, D. Samantha, 2nd Edition, Prentice Hall of India.
2. “Data Structures using C”, Aaron M. Tanenbaum, Pearson Education.
3. “Data Structures using C and C++”, Y. Langsam, 2nd edition, Pearson Education

Reference Books:

1. “An Introduction to Data Structures and Applications”, Jean-Paul Tremblay, Paul G. Sorenson, P. G. Sorenson, Tata McGraw Hill Publication.
2. “Data Structure with C”, Seymour Lipschutz, Tata McGraw Hill.
3. “Ellis Horowitz, Sartaj Sahni & Susan Anderson-Freed, Fundamentals of Data Structures in C”, 2nd Edition, Universities Press.
4. “Data Structure and Algorithms using Python”, Rance D. Necaie, John Wiley Publication.

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

FOUR YEAR BACHELOR OF TECHNOLOGY (B.TECH.) DEGREE PROGRAMME

YEAR / SEMESTER: II / III

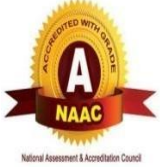
Course Code	Course Name	Hours/Week			Credits	Maximum Marks			ESE Duration (Hrs.)
		L	T	P		Continuous Evaluation	End Sem Exam	Total	
CSE301P	Data Structure Lab	--	--	2	1	25	25	50	2

Note:

- Practical's are based on above Data Structure Theory subject syllabus
- There should be at the most two practicals per unit
- Minimum ten practical's have to be performed
- Do not include study experiment

Sample Practical List:

1. Write a program to perform basic operation on array data structure.
2. Write a program to perform linear and binary search technique.
3. Implement different sorting techniques.
4. Implement various operation on stack using array representation.
5. Implement various operation on queue using array representation
6. Implement various operation on singly Linked list.
7. Implement various operation on doubly Linked list.
8. Write a program for creation of binary tree data structure.
9. Write a program to represent adjacency list in graph.
10. Write a program for accessing elements in hash table.
11. Implement an application using doubly linked list
12. Develop a real time application using suitable data structure.

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

FOUR YEAR BACHELOR OF TECHNOLOGY (B.TECH.) DEGREE PROGRAMME

YEAR / SEMESTER: II / III

Course Code	Course Name	Hours/Week			Credits	Maximum Marks			ESE Duration (Hrs.)
		L	T	P		Continuous Evaluation	End Sem Exam	Total	
CSE302T	Introduction to Python Programming	3	--	--	3	40	60	100	3

Course Objectives:

1.	To gain knowledge of designing and programming in Python
2.	To learn the concepts of lists, tuples, and dictionaries in Python programs
3.	Developing applications in Python using customized and built in modules

Course Outcomes:

At the end of this course, students will be able to

CO1	Understand basic concepts of python.
CO2	Analyze different data structure of python like Strings, List, Tuples, Dictionary and Sets
CO3	Understand the basic data types, control statements and loops and write simple programs in Python.
CO4	Understand and handle Python objects and develop classes required for the given application
CO5	Develop a small application using python

Unit I: Introduction to Python**[7 Hours][12 Marks]**

Introduction to Python, Origin of Python, Python versions, Features of Python, Applications Introduction to python Operators, Identifiers, Keywords, Understanding Python variables, Declaring and using Numeric data types and Strings.

Unit II: Loops and Functions**[8 Hours][12 Marks]**

Control Statement - Conditional Statement Like If, Else, Elif, Loop- While, For, Loop Control Statement - Break, Continue, Pass, Introduction to Functions, Logic with Python Functions, Keyword Arguments, Args and Kwargs, Return Statement, Lambda, Import Module, Date time with Python.

Unit III: Data structures**[7 Hours][12 Marks]**

Data Structures Lists-Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences, Comprehensions.

Unit IV: Exception Handling**[7 Hours][12 Marks]**

Handling Exceptions, Difference between an error and Exception, try catch block, Finally Block, Possible combination of try catch and finally block, Regular expression

Unit V: Python packages**[7 Hours][12 Marks]**

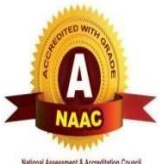
Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages. Introduction to Object Oriented Concept in Python: Object, Classes, Encapsulation, Abstraction and Inheritance

Text Books:

1. Python Programming, Dr.Rupesh Nasre, 1st Edition, AICTE ,New Delhi
2. Programming and Problem Solving with Python by Ashok Namdev Kamthane and Amit Ashok Kamthane, 2nd Edition, McGraw Hill Education
3. Let Us Python, Yashwant Kanetkar and Aditya Kanetkar, 2nd Edition, BPB Press
4. 'Head-First Python' (2nd Edition) by Paul Barry, O'Reilly Publications

Reference Books:

1. "Introduction to Computation and Programming Using Python", John V Guttag, Spring 2013 Edition, Prentice Hall of India
2. "Core Python Programming" -R. Nageswara Rao, 2nd Edition", Dream tech
3. "Core Python Programming , Wesley J. Chun.— 2nd Edition", Prentice Hall

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

FOUR YEAR BACHELOR OF TECHNOLOGY (B.TECH.) DEGREE PROGRAMME

YEAR / SEMESTER: II / III

Course Code	Course Name	Hours/Week			Credits	Maximum Marks			ESE Duration (Hrs.)
		L	T	P		Continuous Evaluation	End Sem Exam	Total	
CS302P	Introduction to Python Programming Lab	--	--	2	1	25	25	50	2

Prerequisite(s): Basic Programming skill

Course Objectives:

1.	To understand fundamentals of writing Python scripts
2.	Learn core Python scripting elements such as variables and flow control structures.
3.	Write Python functions to facilitate code reuse

Course Outcomes:

At the end of this course Student are able to:

CO1	Understand the environment of Python Programming
CO2	Apply the operation on conditions using simple programs
CO3	Analyze the different data structures in Python Programming
CO4	Learn different file handling operations
CO5	Understand file I/O and different packages.

Note:

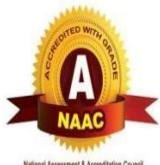
1. There should be at the most two practicals per unit from Python Programming Course
2. Minimum ten practical's have to be performed.
3. Do not include study experiments.
4. At least one practical out of syllabus have to be performed

Programming Language/Tools to be used

- Jupiter Notebook
- Google COLAB
- IDLE (Python)
- Anaconda Navigator
- Python Command Line

Sample Practical List:

1. Programs on Operators
2. Programs on Strings
3. Programs on basic control structures
4. Programs on Loops
5. Programs on Python Data structures.
6. Programs on Functions
7. Programs on Tuples.
8. Programs on Exception handling concepts.
9. Programs on file I/O
10. Programs on Python Packages

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

AND

DEPARTMENT OF ARTIFICIAL ENGINEERING

B. Tech in (Branch Name) And Minors in Computer Science and Artificial Intelligence

YEAR / SEMESTER: II / III

Course Code	Course Name	Hours/Week			Credits	Maximum Marks			ESE Duration (Hrs.)
		L	T	P		Continuous Evaluation	End Sem Exam	Total	
CSAI303T	Basics of Operating System	2	--	--	2	20	30	50	2

Prerequisite(s): None.

Course Objectives:

1.	To explain main components of OS and their working
2.	To familiarize the operations performed by OS as a resource Manager
3.	To explain the different memory management techniques

Course Outcomes:

At the end of this course, students will be able to

CO1	Understand the basic concepts and functions of operating systems.
CO2	Understand the various types of operating systems.
CO3	Understand the Memory Management in Operating System.

UNIT – I

[6 Hours] [10 Marks]

OVERVIEW OF OPERATING SYSTEM: Operating system- Concept, Components of Operating system, Operations of Operating System: Program Management, Resource Management, Security and Protection. Views of OS: User view, System View.

UNIT – II

[9 Hours] [10 Marks]

Different Types of OS- Batch, Multi Programmed, Timed shared, Multiprocessor System, Distributed System, Real time systems. Mobile OS, Android, IOS. Command line-based OS-DOS, UNIX, GUI based OS-WINDOWS, LINUX. Different Services of OS. System Calls -Concepts, types of system calls.

UNIT – III

[9 Hours] [10 Marks]

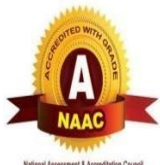
OS Components- Process Management, Main Memory Management, File Management-concepts, Attributes, Operations, types, I/O System Management, Secondary Storage Management, Process: States, Process control Block (PCB). Process Scheduling, Overview of Threads.

Text Books:

1. Operating System Concepts, Silberschatz, Ninth Edition, Willey Publication.
2. Operating Systems, Internals and Design Principles, Stallings, Seventh Edition, Pearson Publication.
3. Modern Operating Systems, Tanenbaum, Fourth Edition. Pearson Publication.

Reference Books:

1. Operating Systems – Internals and Design Principles Stallings, Fifth Edition–2005, Pearson Education/PHI
2. Operating System A Design Approach- Crowley, TMH. 3.
3. Modern Operating Systems, Andrew S. Tanenbaum 2 nd edition, Pearson/PHI
4. UNIX programming environment, Kernighan and Pike, PHI/ Pearson Education
5. UNIX Internals -The New Frontiers, U. Vahalia, Pearson Education.

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
AND
DEPARTMENT OF ARTIFICIAL ENGINEERING
SEMESTER: III

Course Code	Course Name	Hours/Week			Credits	Maximum Marks			ESE Duration (Hrs.)
		L	T	P		Continuous Evaluation	End Sem Exam	Total	
CSAI304T	Open Elective-I: Introduction to Python Programming	3	--	-	3	40	60	100	3

Course Objectives:

1.	To understand applications, features and basics programming structure of Python Language.
2.	To learn how to create simple python programs using functions and variety of data structure available in python.
3.	To learn skill to design an application in Python using customized and built in modules.

Course Outcomes:

At the end of this course, students will be able to

CO1	Understand basic concepts of python programming.
CO2	Understand the basic data types, control statements and loops and write simple programs in Python.
CO3	Analyze different data structure of python like Strings, List, Tuples, Dictionary and Sets
CO4	Understand basics of exception handling using python.
CO5	Understand and handle Python objects and develop classes required for the given application

Unit I: Introduction to Python

[7 Hours][12Marks]

Introduction to Python, Origin of Python, Python versions, Features of Python, Applications of python programming, python Operators, Identifiers, Keywords, Understanding Python variables, Declaring and using Numeric data types, basic concept of Strings, operations of string.

Unit II: Loops and Functions

[8 Hours][12Marks]

Control Statement - Conditional Statement Like If, Else, Elif, Loop- While, For, Loop Control Statement - Break, Continue, Pass, Introduction to Functions, Logic with Python Functions, Keyword Arguments, Args and Kwargs, Return Statement, Lambda, Date time with Python.

Unit III: Data structures

[7 Hours][12Marks]

List, Tuples, Sets, Dictionaries, Sequences, Comprehensions.

Unit IV: Exception Handling

[7 Hours][12Marks]

Introduction to Exceptions Handling in Python, Difference between an error and Exception, try catch block, Finally Block, Possible combination of try catch and finally block.

Unit V: Python packages

[7 Hours][12Marks]

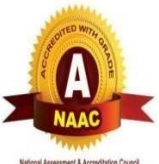
Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages. Introduction to Object Oriented Concept in Python: Object, Classes, Encapsulation, Abstraction and Inheritance.

Text Books:

1. Python Programming, Dr.Rupesh Nasre, 1st Edition, AICTE, New Delhi
2. Programming and Problem Solving with Python by Ashok Namdev Kamthane and Amit Ashok Kamthane, 2nd Edition, McGraw Hill Education
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Reference Books:

1. John V Guttag. “Introduction to Computation and Programming Using Python”, Spring 2013 Edition, Prentice Hall of India
2. R. Nageswara Rao, “Core Python Programming- 2nd Edition”, Dream tech
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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

AND

DEPARTMENT OF ARTIFICIAL INTELLIGENCE

SEMESTER: III

Course Code	Course Name	Hours/Week			Credits	Maximum Marks			ESE Duration (Hrs.)
		L	T	P		Continuous Evaluation	End Sem Exam	Total	
CSAI304P	Open Elective-I: Introduction to Python Programming Lab	--	--	2	1	25	25	50	2

Prerequisite(s): Basic of Python Programming

Course Objectives:

1.	To understand how to start writing simple programming using python language.
2.	To gain practical knowledge of using functions and different data structure.
3.	To learn skill to design an application in Python using customized and built in modules

Course Outcomes:

At the end of this course, students will be able to:

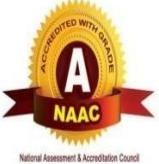
CO1	Understand basic concepts of python.
CO2	Understand the basic data types, control statements and loops and write simple programs in Python.
CO3	Analyze different data structure of python like Strings, List, Tuples, Dictionary and Sets
CO4	Understand basics of exception handling using python.
CO5	Develop a small application using python

Note:

- Practical's are based on “Introduction to Python Programming” Course
- There should be at the most two practicals per unit
- Tools required: Jupyter, VS Code etc.

Sample Practical List:

1. Write a Python program using basic concepts.
2. Write a Python program using if...else structure
3. Write a Python program using functions.
4. Write a Python program to create a module.
5. Write a Python program to use Data Structure concepts (List,tuple,set,dictionary)
6. Write a Python program to convert decimal to binary, octal and hexadecimal using functions.
7. Write a Python program to demonstrate exception handling.
8. Write a Python program to create a package.
9. Write a Python program to demonstrate class and objects in python.

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DEPARTMENT OF HUMANITY AND MANAGEMENT
SYLLABUS OF SECOND YEAR BACHELOR OF TECHNOLOGY
(A Four-Year Degree Programme)
SEMESTER III

Course Code	Course Name	Hours/Week			Credits	Maximum Marks			ESE Duration (Hrs.)
		L	T	P		Continuous Evaluation	End Sem Exam	Total	
HUT305T	Engineering Economics	2	--	--	2	20	30	50	2

Course Objectives:

1.	This Course is designed to gain basic knowledge in Economics and understand the concept of macro and micro level Economics with important economic terminologies and key concepts of Engineering Economics and to create awareness about Market structure, Business cycle and Taxation system.
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Course Outcomes:

On completion of this course, learner will be able to

CO1:	Understand the concept of Demand and Supply and distinguish between Micro and Macro Economics its relationship with the Price.
CO2:	Relate various Factors of Production with reference to different Economic Sectors, Business cycle and Understand the Market Structure.
CO3:	Analyze the Various Concepts of Cost, Causes and Effects of Inflation, Recession and Taxations system.

UNIT I: Basic Concepts of Economics	(8 Hours) (10 Marks)
Definition & Scope of Economics, Difference between Micro and Macroeconomics, Concept of Top and Bottom line of the Organization (Growth), Economic analysis of business, Economics of Operations, Law of Demand, Types of Demand, Law of Supply, Concept and Types of Elasticity of Demand.	
UNIT II: Theory of Production and Market Structure	(8 Hours) (10 Marks)
Factors of Production, Firm and Industry, Market and Market Structures, Perfect Competition, Monopoly, Monopolistic Competition and Oligopoly, Pricing strategies in various markets, Various Phases of Business Cycle, Economies of scale.	
UNIT III: Theory of Cost , Inflation and Taxation	(8 Hours) (10 Marks)
Various Concepts of Cost, Fixed, Variable, Average, Marginal and Total Cost, Inflation , Effect of Inflation, Deflation, Recession, Monetary and Fiscal Measures to Control Inflation, Direct and Indirect Taxes	

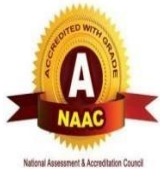
List of Books:

Text Books:

1. Modern Economic Theory – K.K. Dewett, S.Chand Publishers
2. Modern Economics – H. L. Ahuja , S.Chand Publishers
3. Engineering Economics - D.N. Dwivedi, A. Dwivedi ,Vikas Publishing House
4. Industrial Economics. By, Ranjana Seth, Ane Book Pvt Ltd.
5. Industrial Economics. By, Jagdish Sheth, Pearson Publication.

Reference Books:

1. Business Economics. By, K.Rajgopalchar. Atalantic Publishers.
2. Microeconomics. By, Robert Pindyk
3. Business Economics.By, H.L. Ahuja,H. L. Ahuja,Louis Prof. De Broglie. S.Chand.

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DEPARTMENT OF CHEMISTRY
SYLLABUS OF SECOND YEAR BACHELOR OF TECHNOLOGY
(A Four-Year Degree Programme)
SEMESTER III

Course Code	Course Name	Hours/Week			Credits	Maximum Marks			ESE Duration (Hrs.)
		L	T	P		Continuous Evaluation	End Sem Exam	Total	
HUT306T	Environmental Studies	2	--	--	2	20	30	50	2

Course Objectives:

1.	To introduce various natural resources available.
2.	To attain the knowledge about ecosystem and biodiversity.
3.	To understand and evaluate the global scale of environmental problems.

Course Outcomes:

On completion of this course, learner will be able to

CO1:	Utilize the knowledge on natural resources and understand the ecosystem thoroughly.
CO2:	Explain the bio-diversity and its conversion.
CO3:	Identify and analyze the consequences of pollution, application of knowledge for sustainability

UNIT I: Introduction to Natural Resources & Ecosystems	(8 Hours)[10 Marks]
Renewable and Non-Renewable resources: Natural resources and associated problems. a. Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction mining, dams and their effects on forest and tribal problems. b. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological, succession. Food chains, food webs and ecological pyramids. a. Introduction, types, characteristic features, structure and function of the following ecosystem: - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries.	
UNIT II: Biodiversity and its Conservation	(8 Hours)[10Marks]
Introduction - Definition: genetic, species and ecosystem diversity. Bio geographical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values Biodiversity at global, National and local levels. India as a mega diversity nation Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.	
UNIT III: Environmental Pollution & Control	(8 Hours)[10Marks]
• Definition, Cause, effects and control measures of: - Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution • Solid waste Management: Causes, effects and control measures of urban and industrial wastes. • Role of an individual in prevention of pollution. • Pollution case studies. • Environment Protection Act. • Air (Prevention and Control of Pollution) Act. • Water (Prevention and control of Pollution) Act. • Sustainable Development	

Text Books:

1. Benny Joseph, "Environmental Studies", 3rd Edition, McGraw Hill Education Publication, 2017.
2. D. D. Mishra, and S.S. Dara, "A Textbook of Environmental Chemistry and Pollution Control", 7th Edition, S. Chand & Company Ltd., 2004.
3. Textbook of Environmental Studies, Erach Bharucha, Universities Press.
4. A Textbook of Environmental Studies, D.K. Asthana and Meera Asthana, 1st edition, S. Chand.
5. A Textbook of Environmental Studies, Dr. Rajan Misra, Laxmi Publications Pvt. Ltd.

Reference Books:

1. P Aarne Vesilind, J. Jeffrey Peirce, and Ruth F. Weiner, "Environmental Pollution and Control" 4th Edition, Butterworth-Heinemann Publication, 1998.
2. Shibani Ghosh, "Indian Environmental Law: Key concepts and Principles", 1st Edition, Orient BlackSwan Publication, 2019.

