YMCA University of Science and Technology, Faridabad
BCA Scheme of Studies / Examination
Semester – III

Course No.	Course Title	Schedule				Sessional Marks/ Internal	Marks for End Term Examination		Total Marks	Credits
		I	T	P	Total		Theory	Practical		
BCA-DS-201	Python Programming	3		-	3	25	75	-	100	3
BCA-DS-202	Probability and Statistics	3		-	3	25	75	-	100	3
BCA-DS-203	Principles of Operating Systems	3		-	3	25	75	-	100	3
BCA-DS-204	Data Warehouse and Data Mining	3		-	3	25	75	-	100	3
As per list above	General Elective - I	3		-	3	25	75	-	100	3
BCA-17-204(B)	Environmental Science(No credit just qualifying)	3			3		50		Marks will not be added in total	No Credit
BCA-DS-205	Python Programming Lab	-		4	4	25	-	50	75	2
BCA-DS-206	Operating Systems Lab	-		4	4	25	-	50	75	2
BCA-DS-207	Presentation	-		2	2	25	-		25	1
BCA-DS-208	Group Discussion	-		2	2	25	-		25	1
BCA-DT-201	Industrial Training - I					50		50	100	3
	Total				30	275	375	150	800	24

Note: Exam duration will be as under

(a) Theory exams will be of 3 hours duration

(b)Practical exams will be of 3 hours duration

BCA-DS-201: PYTHON PROGRAMMING

BCA III Semester

No. of Credits: 3				Sessional:	25 Marks
L	T	P	Total	Theory :	75 Marks
3	0	0	3	Total :	100 Marks
				Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. Create and execute Python programs
2. Understand the concepts of file I/O
3. Be able to read data from a text file using Python
4. Plot data using appropriate Python visualization libraries

SYLLABUS

UNIT-I

Introduction to Python: Installation and Working with Python, Understanding Python Variables Python Basic Operators, Python Data Types Declaring and using Numeric data types: int, float, complex Using string data type and string operations,

Decision and Loop Control Statements: Basic decision making statements like if, else and elif , Simple for loops in python For loop using ranges, string, list and dictionaries, Use of while loops in python, Loop manipulation using pass, continue, break and else, Programming using Python conditional and loops block

UNIT-11

Functions in Python: Introduction to functions, Syntax and Basics of Functions, Parameters and Arguments in Function, Local and Global scope of a variable, return statement, Recursive functions, Lambda function.

Python List, Tuple Sets and Dictionary Manipulations: Introduction to Lists, creating Lists, Accessing the elements of Lists, List Slicing, Python Inbuilt functions for Lists, passing Lists to a Function, Returning Lists from a function, Introduction to Tuples, Creating Tuples, Tuples Indexing and Slicing, Inbuilt functions for Tuples, Introduction to Sets, Creating Sets, Set in and Not in Operator, Python set Classes, Set operations, Introduction to Dictionaries, Creating a dictionary, Adding and replacing values in Dictionary, Formatting Dictionaries, Deleting items from Dictionaries, Simple Programs on Dictionary.

UNIT-III

Object Oriented Programming in Python: Defining Classes, The Self–parameter and Adding methods to a Class, Accessibilty, The __Init__Method(Constructor Method), __del__ Method(Destructor Method), Method Overloading in Python, Inheritance, Types of of Inherita nce

Importing Modules: Introduction to Modules, Math module, Random module.

Graphics Programming in Python: Getting Stated with the Turtle Module, Moving Turtle in any Direction, The color, bgcolor, circle and speed method of Turtle, Drawing basic shapes using Iterations, Changing color dynamically using List.

UNIT IV

Image processing in Python: Basic libraries for image processing in python such as **OpenCV, Numpy and Scipy libraries, Python Imaging Library (PIL).** Various functions in Image processing using these libraries like open() and show () image, Convert and Save() Image, Resize-thumbnails(),Converting to grayscale image − convert(),**Scaling an Image , Rotating an image , Translating an Image, Edge detection in an Image.**

File Handling in Python: Introduction to File Handling, Opening and closing a file, Writing Text and number to a file, Reading Text and number from a file, The seek() function, Binary files, Reading from and Writing into Binary files.

COURSE OUTCOMES:

After completion of course, students would be able to:

1. Write programs efficiently in python
2. Effectively use numerical analysis libraries of python

Textbooks/Reference Books:

1. Martin C. Brown, Python: The Complete Reference, Tata McGraw-Hill Education.
2. Kamthane Kamthane, Programming and Problem Solving with PYTHON, Tata McGraw-Hill Education.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-DS-202: PROBABILITY AND STATISTICS
BCA III SEMESTER

No. of Credits: 3				Sessional:	25 Marks
L	T	P	Total	Theory :	75 Marks
3	0	0	3	Total :	100 Marks
				Duration of Exam:	3 Hours

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COURSE OBJECTIVES:

1. To Apply probability theory to set up tree diagrams
2. To Apply probability theory via Bayes' Rule
3. To Describe the properties of discrete and continuous distribution functions
4. To Use method of moments and moment generating functions
5. To Assess the consistency, efficiency and unbiasedness of estimators
6. To Apply method of maximum likelihood estimation
7. To Apply the Central Limit Theorem
8. To Use statistical tests in testing hypotheses on data

SYLLABUS

UNIT I

RANDOM VARIABLES AND DISTRIBUTION FUNCTIONS: Discrete and continuous random variables - distribution function and its properties - probability mass function and probability density function - discrete and continuous probability distributions - Binomial, Geometric, Poisson, Uniform, Exponential and Normal distributions.

UNIT II

MOMENTS AND MOMENT GENERATING FUNCTIONS: Expectation of a random variable – probability generating function – properties - moment generating function.

TWO DIMENSIONAL RANDOM VARIABLES: Joint, marginal and conditional distribut ion functions - independence of random variables.

UNIT III

DESCRIPTIVE STATISTICS: Types of data - primary and secondary data - classification and representation of data - formation of frequency distribution - various measures of central tendency, dispersion - and their merits and demerits - concept of skewness and kurtosis.

UNIT IV

CORRELATION AND CURVE FITTING: Correlation coefficient and regression - rank correlation - curve fitting by least square methods, fitting a straight line, parabola, power curve and exponential curves. (no derivation, numerical problems only)

COURSE OUTCOMES:

After completing this course, students will be able:

1. Appreciate the importance of probability and statistics in computing and research.
2. Develop skills in presenting quantitative data using appropriate diagrams, tabulations and summaries.
3. Use appropriate statistical methods in the analysis of simple datasets.
4. Interpret and clearly present output from statistical analyses in a clear concise and
5. understandable manner.

Text Books/ Reference Books:

1. Richard Arnold Johnson, Irwin Miller, John E. Freund , Miller & Freund's Probability and Statistics for Engineers, Prentice Hall, 2011.
2. Dr. P. Kandaswamy, Dr. K. Thilagavathy and Dr. K. Gunavathy, Probability and Queuing Theory, Revised edition, S. Chand Publishing, 2013.
3. T. Veerarajan, Probability, Statistics and Random Processes, Tata McGraw Hill, 2nd edition.
4. Goon, A.M., M. K. Gupta and B. Das Gupta Fundamentals of Statistics- Vol. I, World Press Ltd, Kolkata, 2002.
5. Gupta, S.C. and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi, 2002.
6. Hogg, R.V. and A. Craig, Introduction to Mathematical Statistics, McMillan Publishing co., Inc. 1978.
7. Mood A.M., F.A. Graybill and D.C. Boes, Introduction to Theory of Statistics McGraw Hill Book Co., 1974.
8. Sheldon M. Ross, Introduction to Probability and Statistics for Engineers and Scientists, Fourth Edition, Elsevier.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-DS-203: INTRODUCTION TO OPERATING SYSTEM

BCA III Semester

No. of Credits: 3			Sessional:	25 Marks
L	T	P	Total	Theory :	75 Marks
3	0	0	3	Total :	100 Marks
				Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. To learn the fundamentals of Operating Systems.
2. To learn the mechanisms of OS to handle processes, threads and their communication.
3. To know the components and management aspects of concurrency management viz. Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols.
4. To learn the mechanisms involved in memory management in contemporary OS.
5. To gain knowledge on Input/ Output management aspects of Operating systems.

SYLLABUS

UNIT – I

Fundamentals of Operating system: Introduction to Operating System, its need and operating System services, early systems, Structures - Simple Batch, Multi programmed, timeshared, Personal Computer, Parallel, Distributed Systems, and Real-Time Systems. Process Management: Process concept, Operation on processes, Cooperating Processes, Threads, and Inter-process Communication.

UNIT-II

CPU Scheduling: Basic concepts, scheduling criteria, scheduling algorithms: FCFS, SJF, Round Robin & Queue Algorithms.

Deadlocks: Deadlock characterization, Methods for handling deadlocks, Banker's Algorithm.

UNIT-III

Memory Management: Logical versus Physical address space, Swapping, Contiguous allocatio n, Paging, Segmentation.

Virtual Memory: Demand paging, Performance of demand paging, Page replacement, Page replacement Algorithms, Thrashing.

UNIT-IV

File management: File system Structure, Allocation methods: Contiguous allocation, Linked allocation, Indexed allocation, Free space management: Bit vector, Linked list, Grouping, Counting.

Device Management: Disk structure, Disk scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK.

COURSE OUTCOMES:

After the completion of the course, the students will be able to:

1. Create processes and threads.
2. Develop algorithms for process scheduling for a given specification of CPU utilizat io n, Throughput, Turnaround Time, Waiting Time, and Response Time.
3. For a given specification of memory organization, develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
4. Design and implement file management system.
5. For a given I/O device and OS (specify), develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

Text Books/ Reference Books:

1. Abraham Silberschatz, Peter B. Galvin, " Operating System Concepts", Addison Wesley publishing. Co., 7th. Ed., 2004.
2. Nutt Gary, "Operating Systems", Addison Wesley Publication, 2000.
3. Andrew S. Tannenbaum, "Modern Operating Systems", Pearson Education Asia, Second Edition, 2001.
4. William Stallings, "Operating Systems, "Internals and Design Principles", 4th Edition, PH, 2001.
5. Ekta Walia, "Operating Systems Concepts", Khanna Publishes, New Delhi, 2002.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-DS-204: DATA WAREHOUSE AND DATA MINING

BCA III Semester

No. of Credits: 3			Sessional:	25 Marks
L	T	P Total	Theory :	75 Marks
3	0	0 3	Total :	100 Marks
			Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

1. Be familiar with mathematical foundations of data mining tools.
2. Understand and implement classical models and algorithms in data warehouses and data mining.
3. Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.
4. Master data mining techniques in various applications like social, scientific and environmental context.
5. Develop skill in selecting the appropriate data mining algorithm for solving practical problems.

SYLLABUS

UNIT-I

Data warehousing, Definition, usage and trends. DBMS vs data warehouse, Data marts, Metadata, Multidimensional data mode, Data cubes, Schemas for Multidimensional Database: stars, snowflakes and fact constellations.

Data warehouse process & architecture, OLTP vs OLAP, ROLAP vs MOLAP, types of OLAP, servers, 3-Tier data warehouse architecture, distributed and virtual data warehouses, data warehouse manager.

UNIT II

Data warehouse implementation, computation of data cubes, modeling OLAP data, OLAP queries manager, data warehouse back end tools, complex aggregation at multiple granularities, tuning and testing of data warehouse.

Data mining definition & task, KDD versus data mining, data mining techniques, tools and applications.

UNIT-III

Data mining query languages, data specification, specifying knowledge, hierarchy specificat io n, pattern presentation & visualization specification, data mining languages and standardization of data mining.

Data mining techniques: Association rules, Clustering techniques, Decision tree knowledge discovery through Neural Networks & Genetic Algorithm, Rough Sets, Support Victor Machines and Fuzzy techniques.

UNIT-IV

Mining complex data objects, Spatial databases, Multimedia databases, Time series and Sequence data mining Text Databases and mining Word Wide Web.

COURSE OUTCOMES:

1. The students will be able to understand basic concepts of data warehouse and data mining, techniques and applications
2. The students will be able to understand the techniques to extract patterns from transactiona l database using Association and Apriori algorithms
3. The students will be able to understand different clustering techniques and will be able to cluster data sets
4. The students will be able to classify data set into different classes and acquire the knowledge to make predications based on classified data
5. The students will be able to understand and analyze time series data
6. The students will be able to understand types of web mining viz. content, structure and usage mining. Web content mining in detail.
7. The students can extend the Graph mining algorithms to Web mining
8. Students will understand advance applications of data mining

Text Books/References:

1. Data Warehousing In the Real World; Sam Anahory& Dennis Murray; 1997, Pearson
2. Data Mining- Concepts & Techniques; Jiawei Han &MichelineKamber- 2001, Morgan Kaufmann.
3. Data Mining Techniques; ArunPujar; 2001, University Press; Hyderbad.
4. Data Mining; Pieter Adriaans&DolfZantinge; 1997, Pearson,
5. Data Warehousing, Data Miniing and OLTP; Alex Berson, 1997, Mc Graw Hill.
6. Data warehousing System; Mallach; 2000, Mc Graw Hill.
7. Building the Data Warehouse; W.H. Inman, 1996, John Wiley & Sons.
8. Developing the Data Warehouses; W.H Ionhman,C.Klelly, John Wiley & Sons.
9. Managing the Data Warehouses; W.H.Inman, C.L.Gassey, John Wiley & Sons.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-204 (B): ENVIRONMENT SCIENCE
BCA III Semester

No. of Credits: 0				Sessional:	NIL
L	T	P	Total	Theory :	50 Marks
3	0	0	3	Total :	50 Marks
				Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 10 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 10 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

The prime objective of the course is to provide the students a detailed knowledge on the threats and challenges to the environment due to developmental activities. The students will be able to identify the natural resources and suitable methods for their conservation and sustainab le development. The focus will be on awareness of the students about the importance of ecosystem and biodiversity for maintaining ecological balance. The students will learn about various attributes of pollution management and waste management practices. The course will also describe the social issues both rural and urban environment and environmental legislation.

SYLLABUS

UNIT-I

The Multidisciplinary Nature of Environmental Studies: Definit io n, scope and importance. Need for public awareness. Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems: Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources, Role of an individual in conservation of natural resources.

UNIT-II

Ecosystems: 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. Introduction, types, characteristic features, structure and function of the following ecosystem: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Biodiversity and its Conservation: Introduction–Definition: genetic, species and ecosystem diversity, bio geographical classification of India, India as a mega-diversity nation, Hot-spots of biodiversity, threats to biodiversity, Conservation of biodiversity: in situ and ex-situ conservation of biodiversity.

UNIT-III

Environmental Pollution: Definition, Causes, effects and control measures of: Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards.

Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster manageme nt: floods, earthquake, cyclone and landslides.

UNIT-IV

Social Issues and the Environment: From Unsustainable to Sustainable Development Urban problems related to energy. Water conservation, rain water harvesting, watershed manageme nt. Resettlement and rehabilitation of people; its problems and concerns. Case studies.

Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamatio n. Consumerism and waste products.

COURSE OUTCOMES:

After completion of this course, student will be able to

1. Understand core concepts and methods from ecological and physical sciences and their application in environmental problem solving.
2. Appreciate the ethical, cross cultural, and historical context of environmental issues and the links between human and natural systems.
3. Understand about the disaster management and various natural calamities.
4. Understand the usage of Renewable and Non Renewable Resources.
5. Understand the Environmental Ethics and his/her responsibility towards environment.

Text Books/ Reference Books:

1. Perspectives in Environmental Studies by A. Kaushik and C. P. Kaushik, New age international publishers.
2. Environmental Studies by Benny Joseph, Tata McGraw Hill Co, New Delhi.
3. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
4. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela 2008 PHI Learning Pvt Ltd.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-DS-205: PYTHON PROGRAMMING
BCA III Semester

No. of Credits: 2				Sessional:	25 Marks
L	T	P	Total	Practical :	50 Marks
0	0	4	4	Total :	75 Marks
				Duration of Exam:	3 Hours

LIST OF PROGRAMS:

1. Write a Python program which accepts the radius of a circle from the user and compute the area.
2. Write a Python program to get the largest number from a list.
3. Write a Python program to display the first and last colors from the following list. color_list = ["Red","Green","White" ,"Black"].
4. Write a Python program to calculate the sum of three given numbers, if the values are equal then return thrice of their sum.
5. Write a Python program to find whether a given number (accept from the user) is even or odd, print out an appropriate message to the user.
6. Write a Python script to add a key to a dictionary.
7. Write a Python script to check if a given key already exists in a dictionary.
8. Write a Python function to sum all the numbers in a list.
9. Write a Python script to make calculator using Tkinter.
10. Write a program to implement file handling in python.
11. Write a Python script to perform various functions on Images.

BCA-DS-206: OPERATING SYSTEMS LAB
BCA III Semester

No. of Credits: 2				Sessional:	25 Marks
L	T	P	Total	Practical :	50 Marks
0	0	4	4	Total :	75 Marks
				Duration of Exam:	3 Hours

List of Programs:

- Study of WINDOWS 2000 Operating System.
- Administration of WINDOWS 2000 (including DNS, LDAP, Directory Services)
- Study of LINUX Operating System (Linux kernel, shell, basic commands pipe & filter
- Administration of LINUX Operating System.
- Writing of Shell Scripts (Shell programming)
- AWK programming.