Prestige Institute of Management & Research, Gwalior

NIRF I NAAC 'A' GRADE I AUTONOMOUS

Course Curriculum

BCA

2024-28

Prestige Institute of Management & Research, Gwalior

Airport Road, Opposite DD Nagar, Gwalior (M.P.) INDIA

Prestige Institute of Management & Research, Gwalior													
Examination Scheme													
BCA II Semester													
S. No.	**Code**	**Subject**	**Cat**	**L**	**T**	**P**	**C**	**Contacts Hrs/Wk**	**IA***		**EA***		**Total Marks**
									Max	**Min**	**Max**	**Min**	
1	BCA - 201	Data Structure	CC	3	1		4	4	40	14	60	21	100
2	BCA - 202	DBMS	CC	3	1		4	4	40	14	60	21	100
3	BCA - 203	Statistical Methods	CC	3	1		4	4	40	14	60	21	100
4	BCA - 204	Environmental Science and Sustainability	MDE	3	1		4	4	40	14	60	21	100
5	BCA - 205	Data Structure Lab	CC		1	2	2	3	20	7	30	11	50
6	BCA – 206	DBMS Project Lab	CC		1	3	4	4	40	14	60	21	100
7	BCA - 207	Personality Development	AEC	1		1	2	2	50	18			50
8	BCA-208	Health and wellness	VAC	-	-	-	-	-	-	-	-	-	
		Total		13	6	6	24	25	270	95	330	116	600

COURSE OUTLINE

Data Structure **PAPER CODE: BCA-201**	**Max. Marks: 100** **Min. Marks: 40** **External 60** **Internal: 40**

Credits: 04

Course Outcomes:

CO1a	Understand the basic concepts of data structure & articulate linear data structure and permitted operations
CO1b	Understand and apply linked list data structure for solving problems
CO2	Articulate the tree data structures and permitted operations
CO3	Articulate the graph data structures and permitted operations
CO4	Implement Searching and Sorting algorithms & Understand the concepts of file organization techniques

COPO Matrix:

CO/PO Matrix					
Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1a	2	1	1	1	2
CO1b	2	1	1	1	2
CO2	3	1	1	1	2
CO3	3	1	1	1	2
CO4	2	1	1	1	2

Course Mapping:

Local	**Regional**	**National**	**Global**
Y	Y	Y	Y

Professional Ethics	**Gender**	**Human Values**	**Environment & Sustainability**
N	N	N	N

Employability	**Entrepreneurship**	**Skill Development**
Y	N	N

Course Pedagogy:
Lecture, hands on analysis
Course Content:
UNIT 1: Introduction To Data Structure: need and classification of data structure, Array, Records,
Stacks: Introduction to Stack & Primitive Operation on Stack, Stack as an Abstract Data Type, Stacks Application: Infix, Post Fix, Prefix and Recursion, Conversion from infix to postfix/prefix expression using Stack, Evaluation of postfix/ prefix expressions

UNIT 2: Queue: Introduction to Queues, Primitive Operations on the Queues, Queue as an Abstract Data Type, Circular Queue, Dequeue, Priority Queue, Applications of Queue.
Pointer, It's Limitation and Operation. Linked List & their type: linear, circular &Doubly linked list, Operations on various type of linked list, application of Linked list.

UNIT 3: Tree: General & Binary Tree. Conversion of General to Binary Tree. Binary Search Tree (BST) &It's Representation And Operation. Traversal Methods- In Order, Preorder & Post Order, Application of Binary Tree: Manipulation of Arithmetic Expression. Multiway Search Tree, Balance Tree & Their Types.

UNIT 4: Graph: Graph & Their Category & Representations, Traversing Technique: Breadth First & Depth First Search. Spanning Trees (St), Technique of Minimun Spanning Tree (MST), Application of Graphs: Pert & Related Techniques.

UNIT 5: Heaps and Hash Table. Introduction to file organization; Sequential, Indexed sequential, Relative & Direct file organization. Searching &Sorting: Linear& Binary Search. Sorting: Concept, selection sort, Bubble sort merge Sort, Tree sort & Partition - Exchange sort.

Suggested Readings:

1. Trembley &Sorrenson. *Data Structure*. Tata Mcgraw Hill.
2. Salaria R.S. *Data Structures and Algorithms using C++.* Khanna Publishing.
3. Lipschuists. *Data Structure*. Schaum's Outline Series. Mcgraw Hill Publication.

Course Evaluation Criteria:

Instruments	**Marks**
Mid Term Exam	20
Quiz	5
Class Presentation	5
Case Study	5
Class Participation (Skill Development)	5
Final Exam	60
Total	100

Marks Distribution Scheme for final exams: (For 4 Credit Course)*
***will vary as per credits**

Unit	Marks
1	10
2	10
3	10
4	10
5	10
Case Study	10
Final Examination	60
Total	100

COURSE OUTLINE

Database Management System **PAPER CODE: BCA 202**	**Max. Marks: 100** **Min. Marks: 40** **External 60** **Internal: 40**

Credits: 04

Course Outcomes:

CO1a	Understand the Database concepts, DBMS software and supported architecture.
CO1b	Understand to design and implement databases using concepts of data models
CO2	Understand and analyze databases using normalization concepts.
CO3	Apply SQL and relational algebra expressions to retrieve and manage database
CO4	Understand transaction processing and concurrency control concepts

COPO Matrix:

CO/PO Matrix					
Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1a	1	1	-	1	2
CO1b	2	1	1	2	2
CO2	2	2	-	1	3
CO3	2	3	3	2	2
CO4	2	2	1	1	2

Course Mapping:

Local	**Regional**	**National**	**Global**
No	No	Yes	Yes

Professional Ethics	**Gender**	**Human Values**	**Environment & Sustainability**
Yes	No	Yes	No

Employability	**Entrepreneurship**	**Skill Development**
Yes	No	Yes

Course Pedagogy:
Lecture, Case study, hands on Practical

Course Content:
UNIT 1: **Introduction:** Database system concepts, Data base system, Advantages of database systems; **Data Architecture of data system**: View/Schema, logical, conceptual and physical and their interrelationship DDL, DML and data dictionary, Data base administrator. Integrity Constraints, Generalization, Specialization, Aggregation, **Entity Relationship Model:** Entity, Attributes, Strong & weak entities, Relationships, E-R Modeling Symbols

UNIT 2: **Relational DBMS;** RDBMS Terminology, Relational Data Structure, Data Integrity, Codd's Rule, Overview of Relational Algebra and Relational Calculus, Relational Database Design: Primary Keys, Foreign Keys, Candidate Keys, Relationships, Normalization, Purpose of Normalization, First Normal Form, Second Normal Form, Third Normal Form

UNIT 3: Introduction to SQL:
Basic SQL queries to retrieve and manipulate data, Data Definition Language (DDL) commands, Data Manipulation Language (DML) commands, Data Control Language (DCL) Commands, Transaction Control Language (TCL) Commands.

UNIT 4: Advanced SQL & JOIN Operations:
Complex SQL queries to retrieve and manipulate data, Introduction to functions and expressions, GROUP BY, ORDER BY, and HAVING clauses, Introduction to JOIN operations (INNER JOIN, LEFT JOIN, and RIGHT JOIN)

UNIT V: Data Security & Integrity:
Transactions: Transaction concept, Transaction Properties, Transaction States, Concurrency Control: Concurrency Control Schemes - Lock Based Protocols, Timestamp Based Protocols, Deadlock handling, User Defined Transactions, Database Security, Database Recovery.

Suggested Readings:

1. ***Ullman. Principles of Database Systems, 2e. Galgotia Publications.***
2. ***Silberschatz, Korth, &Sudershan. Database System Concepts, 5e. McGraw Hill.***
3. ***Desai, Bipin C. An Introduction to Database System. Galgotia Publications.***

Course Evaluation Criteria:

Instruments	Marks
Mid Term Exam	20
Quiz	5
Class Presentation	5
Case Study	5
Class Participation (Skill Development)	5
Final Exam	60
Total	100

Marks Distribution Scheme for final exams: (For 4 Credit Course)*
***will vary as per credits**

Unit	Marks
1	12
2	12
3	12
4	12
5	12
Final Examination	60
Total	100

COURSE OUTLINE

MATHEMATICS II **STATISTICAL METHODS** **PAPER CODE: 203**	**Max. Marks: 100** **Min. Marks: 40** **External 60** **Internal: 40**

Credits: 04

Course Objectives:

CO1a	To Understand the concept of statistics and analyze statistical data graphically using frequency distributions.
CO1b	To Analyze statistical data using measures of central tendency, dispersion, skewness and Kurtosis.
CO2	Understand the concept of basic terminology of probability and use of Normal distribution to find area under normal curve.
CO3	Apply the concept of correlation & Regression to analyze the underlying relationships between the variables.
CO4	Analyze statistical inference techniques (including statistical estimation and hypothesis testing) in business situations.

COPO Matrix:

CO/PO Matrix					
Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1a	3	3	2	2	1
CO1b	3	3	2	1	1
CO2	3	2	-	-	1
CO3	3	2	2	2	2
CO4	2	2	2	2	2

Course Mapping:

Local	**Regional**	**National**	**Global**
Y	Y	Y	Y

Professional Ethics	**Gender**	**Human Values**	**Environment & Sustainability**
Y	N	N	N

Employability	**Entrepreneurship**	**Skill Development**
Y	N	Y

Course Pedagogy:

Lecture, Class Assignment, hands on analysis

Course Content:

UNIT 1:

Introduction of statistics: Concept, Scope, Importance and limitations of Statistics. **Frequency Distribution:** Discrete and continuous frequency distribution. **Graphical and Diagrammatic Representation:** Construction of Histogram, Ogive Curves, Bar diagram, frequency polygon.

UNIT 2:

Measures of central tendency: Mean, Median, Mode.

Measures of Dispersion: Concept of dispersion methods of measuring dispersion- Range, Mean deviation, Quartile deviation, Standard Deviation and Coefficient of variation.Concept of Skewness and kurtosis.

UNIT 3:

Probability Theory: Concept and Importance of the probability, Basic terminology, Calculation of probability, Addition theorem, Multiplication theorem, Conditional probability &Baye's Theorem.

Theoretical Probability Distribution: Normal distribution and its application (Area under the normal curve).

UNIT-4:

Correlation: Concept and Importance of Correlation, Types of Correlation, Karl Pearson's correlation coefficient, Spearman's Rank correlation coefficient.

Linear Regression: Meaning and Uses of regression analysis, Regression lines, Regression co-efficient and its properties, Regression equations (a) By using mean, SD and coefficient of correlation and (b) by using method of least square.

UNIT-5:

Testing of Hypotheses: Introduction and types of hypothesis, level of significance Type I and Type II Error. Tests of Significance: Tests for simple hypotheses t and Z-statistics.

Suggested Readings:

- Gupta, S. C. (2017). Fundamentals of Statistics. New Delhi: Himalaya Publishing House.
- Beri, G.C. (2009). Business Statistics, 2e. Tata McGraw Hill.
- *Sharma, J. K., Business Statistics, 2e. Pearson Education.*
- *Gupta, S.P. Statistical Methods. S. Chand & Sons, New Delhi.*

Reference Reading:

- *Black, K. Business Statistics for Contemporary Decision Making. Wiley Student Edition.*
- Richard Levin and David Rubin, Statistics for Management, Prentice Hall Of India, New Delhi, 2011,7th Edition
- Sharma J K., Fundamentals of Business Statistics, Second Edition, Vikas Publishing House Private Limited,2013
- *Render, and Stair J.R. Quantitative Analysis for Management, 7e. PHI.*

Course Evaluation Criteria:

Instruments	Marks
Mid Term Exam	20
Quiz	5
Class Presentation	5
Assignment	5
Class Participation (Skill Development)	5
Final Exam	60
Total	100

Marks Distribution Scheme for final exams:

Unit	Marks
1	12
2	12
3	12
4	12
5	12
Final Examination	60
Total	100

COURSE OUTLINE

Environmental science &Sustainability **PAPER CODE: BCA-204 (MDE)**	**Max. Marks: 100** **Min. Marks: 40** **External 60** **Internal: 40**

Credits: 04

Course Outcomes:

CO1a	Comprehend the Fundamentals of Ecology and Environmental Science
CO1b	Understand and Appreciate Biodiversity and Its Protection
CO2	Apply Principles of Sustainable Development
CO3	Conduct Environmental Experiments and Analysis
CO4	Develop and Disseminate Environmental Conservation Messages

COPO Matrix:

CO/PO Matrix					
Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1a	2	2	2	1	1
CO1b	1	1	2	2	1
CO2	2	3	2	2	3
CO3	2	2	1	2	3
CO4	1	2	2	1	2

Course Mapping:

Local	**Regional**	**National**	**Global**
Y	Y	Y	Y

Professional Ethics	**Gender**	**Human Values**	**Environment &Sustainability**
Y	Y	Y	Y

Employability	**Entrepreneurship**	**Skill Development**
Y	N	Y

Course Pedagogy:

Lecture, Case study, hands on analysis

Course Content:

Unit 1 : Study of Environment and Ecology

Defining Environment. Ecosystem – Defination, Components, structure and function, energy flow, food chain, food web , Ecological pyramids and types.

Unit 2 : Bio-diversity and its Protection

Introduction- Genetic, species and ecosystem diversity. Value of bio-diversity. India as a nation of mega bio-diversity center, bio-diversity at national and local levels.

Unit 3 :**Sustainable Development**

- **Principles of Sustainability:**
  - Sustainable development goals (SDGs)
- **Sustainable Agriculture and Food Systems:**
  - Organic farming, permaculture, and agroforestry
  - Food security and sustainable diets
- **Sustainable Urban Development:**
  - Green buildings and sustainable cities

Unit 4 : Disaster Management, Conservation of Laws for Air and Water Pollution, Wildlife Conservation Laws, Role of IT in environmental protection.

Unit 5: Student need to shoot short films or animations about environmental conservation and sustainability.

Suggested Readings:

- Benny Joseph, "Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.
- Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
- ErachBharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 2013.Andy Jones, Michel Pimbert and Janice Jiggins, 2011. Virtuous Circles: Values, Systems, Sustainability. IIED and IUCN CEESP, London.
- Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
- Essentials of Entrepreneur ship and Small Business Management (Sled): Thomas W.
- Zimmerer, and Norman M. Scarborough. PHI
- Entrepreneurship: Strategies and Resources, 3/E: Marc Dollinger: Prentice Hall
- Bringing New Technology to Market- Kathleen R. Allen, Prentice Hall Entrepreneurship in Action, 2/E - Mary Coulter; Prentice Hall.

Course Evaluation Criteria:

Instruments	**Marks**
Mid Term Exam	20
Quiz	5
Class Presentation	5
Case Study	5
Class Participation (Skill Development)	5
Total Marks- Internal Examination	**40**

Marks Distribution Scheme for final exams: (For 4 Credit Course)*

will vary as per credits

Unit	**Marks**
1	10
2	10
3	10
4	10
5	10
Case Study	10
Total Marks- End Examination	**60**

Total (Internal Assessment + External Assessment)	**100**

COURSE OUTLINE

Database Management System Lab **PAPER CODE: BCA 206**	**Max. Marks: 50** **Min. Marks: 18** **External 30** **Internal: 20**

Credits: 04

Course Outcomes:

CO1	Design relational databases that meet specific application requirement.
CO2	Write the SQL statement for creating databases in RDBMS
CO3	Write SQL statements for insert, update, and delete data from databases
CO4	Write SQL statements for fetching desired data from databases

COPO Matrix:

CO/PO Matrix					
Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	2	2	2	-	3
CO2	1	1	1	-	3
CO3	1	1	1	-	3
CO4	1	1	1	-	3

Course Mapping:

Local	**Regional**	**National**	**Global**
No	No	Yes	Yes

Professional Ethics	**Gender**	**Human Values**	**Environment & Sustainability**
Yes	No	No	No

Employability	**Entrepreneurship**	**Skill Development**
Yes	No	Yes

Course Pedagogy:
Lecture, Case study, hands on Practical

Course Content:
Practical Exercises:
Create and use the following database schema to answer the given queries.
Employee Schema

Field	Type	NULL	KEY	DEFAULT	
Eno	Char(3)	NO	PRI	NIL	
Ename	Varchar(5 O)	NO		NIL	
Job_type	Varchar(5 0)			NO	NIL
Manager	Char(3)		Yes F K	NIL	
Hire_date	Date	NO		NIL	
Dno	Integer	YES	PK	NIL	
Commission	Decimal(10,2)	YES		NIL	
Salary	Decimal(7,2)			NO	NIL

DEPARTMENT Schema

Field	Type	NULL	KEY	DEFAULT	
Dno	Integer	NO	PRI	NULL	
Dname	Varchar(SO)		NO PRI		NULL
Location	Varchar(SO)			Yes	New Delhi

Query List

1. Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.
2. Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.
3. Query to display the Employee Name and Salary of all the employees earning more than $2850.
4. Query to display Employee Name and Department Number for the Employee No: 7900.
5. Query to display Employee Name and Salary for all employees whose salary is not in the range of $1500 and $2850.
6. Query to display Employee Name and Department No. of all the employees in Dept 10 and Dept 30 in the alphabetical order by name.
7. Query to display Name and Hire Date of every Employee who was hired in 1981.
8. Query to display Name and Job of all employees who don't have a current Manager.
9. Query to display the Name, Salary and Commission for all the employees who earn commission.
10. Sort the data in descending order of Salary and Commission.
11. Query to display Name of all the employees where the third letter of their name is 'A'.
12. Query to display Name of all employees either have two 'R's or have two "A's in their name and are either in Dept No = 30 or their Manger's Employee No. = 7788.
13. Query to display Name, Salary and Commission for all employees whose Commission Amount is 14 greater than their Salary increased by 5%.
14. Query to display the Current Date.

15. Query to display Name. Hire Date and Salary Review Date which is the lst Monday after six months of employment.
16. Query to display Name and calculate the number of months between today and the date each employee was hired.
17. Query to display the following for each employee <E-Name> earns <Salary> monthly but wants < 3 " Current Salary >. Label the Column as Dream Salary.
18. Query to display Name with the 1st letter capitalized and all other letter lowercase and length of their name of all the employees whose name starts with 'J', 'A' and 'M'.
19. Query to display Name, Hire Date and Day of the week on which the employee started.
20. Query to display Name, Department Name and Department No for all the employees.
21. Query to display Unique Listing of all Jobs that are in Department # 30.
22. Query to display Name, Dept Name of all employees who have an 'A' in their name.
23. Query to display Name, Job, Department No. And Department Name for all the employees working at the Dallas location.
24. Query to display Name and Employee no. Along with their Manger's Name and the Manager's employee no; along with the Emploees' Name who do not have a Manager.
25. Query to display Name. Dept No. And Salary of any employee whose department No. and salary matches both the department no. And the salary of any employee who earns a commission.
26. Query to display the Highest. Lowest. Sum and Average Salaries of all the employees
27. Query to display the number of employees performing the same Job type functions.
28. Query to display the Department Name, Location Name, No. of Employees and the average salary for all employees in that department.
29. Query to display Name and Hire Date for all employees in the same dept. as Blake.
30. Query to display the Employee No. And Name for all employees who earn more than the average salary.

Suggested Readings:

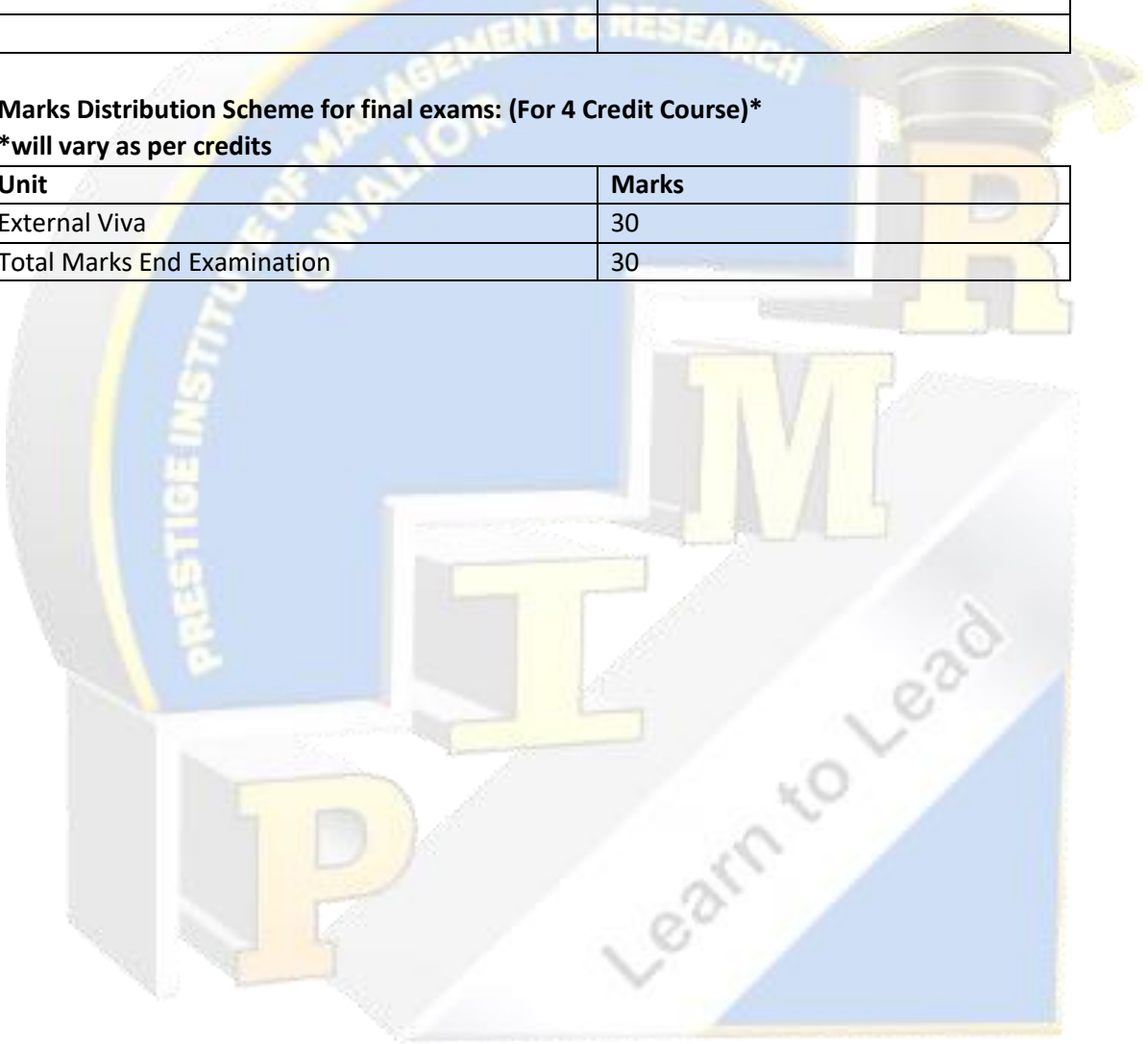
1. **Chun, J Wesley, Core Python Programming, Second Edition, Pearson, 2007 Reprint 2010**
2. **Barry, Paul, Head First Python, 2nd Edition, O Rielly, 2010**
3. **Lutz, Mark, Learning Python, 4th Edition, O Rielly, 2009**

Course Evaluation Criteria:

Instruments	Marks
Assignment 1	5
Assignment 2	5
Assignment 3	5
Viva	5
Total	20

Marks Distribution Scheme for final exams: (For 4 Credit Course)*
***will vary as per credits**

Unit	Marks
External Viva	30
Total Marks End Examination	30



COURSE OUTLINE

Personality Development **PAPER CODE: BCA-207 (AEC)**	**Max. Marks: 50** **Min. Marks: 18** **Internal: 50**

Credits: 02

Course Outcomes:

CO1a	To develop talent, facilitate employability enabling the incumbent to excel and sustain in ahighly competitive world of business.
CO1b	To bring about personality development with regard to the different behavioural dimensions that has far reaching significance in the direction of organizational effectiveness.
CO2	To make students know about self-awareness, life skills, soft skills, need for personal development etc. The student will be able to understand, analyze develop and exhibit accurate sense of self.
CO3	Think critically and demonstrate knowledge of personal beliefs and values and a commitment to continuing personal reflection and reassessment.
CO4	Learn to balance confidence with humility and overcome problems associated with personality.

COPO Matrix:

CO/PO Matrix					
Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1a	-	-	-	2	-
CO1b	-	-	-	3	-
CO2	-	-	-	3	-
CO3	-	-	-	3	-
CO4	-	-	-	3	-

Course Mapping:

Local	**Regional**	**National**	**Global**
Y	Y	Y	Y

Professional Ethics	**Gender**	**Human Values**	**Environment &Sustainability**
Y	Y	Y	Y

Employability	**Entrepreneurship**	**Skill Development**
Y	Y	Y

Course Pedagogy:
Lecture, PPT's , Mock Group Discussions, Extempore, JAM etc
Course Content:

1. Functional English through Newspaper reading.
2. Know Yourself- SWOT Analysis, Self Introduction.
3. P's and Q's
4. Goal setting
5. Time & Stress Management.
6. Power of Listening
7. Body Language
8. Art of persuasive speaking- JAM, Extempore, Mock GD's
9. Story-telling, narration.
10. Grooming, Self Presentation, Gender sensitivity.

Suggested Readings:
1. Time Management by John Adair
2. Communication Skills
3. Body Language by Allan Pease
4. Correct manners & Etiquettes by Eric Watson
5. Personality Development by Wallace & Masters

Course Evaluation Criteria: GD/ Personal Interview / Viva

Total (Internal Assessment)	**50**