





Paper Code: BCA

102 Subjects: Applied Mathematics

A. Introduction

Objective: The objectives of this course are to provide the learners with the following: 1. The Knowledge of mathematical probability 2. Understanding of various numerical techniques 3. Familiarity with the Linear Programming and its applications

COBCA102.2 Understand various numerical techniques and apply them to solve real life problems COBCA102.3 Analyse and evaluate the accuracy of common Numerical Methods COBCA102.4 Develop a mathematical model for real life situation and solving it Using Linear programming technique C. Program Outcomes PO1. PO1. Understand the fundamental concepts of Computers, Software hardware and peripheral devices and evolution of computer technologies. PO2. Familiarized with Business environment and Information Technology and its Applications in different domains. PO3. Gain knowledge to identify, explain and apply functional programming and object-oriented programming techniques and use of databases to develop computer programs. PO4. Analyze, design, implement and evaluate computerized solutions to real life problems, using appropriate computing methods including web applications. PO5. Understand the front end and backend of software applications. PO6. Acquire knowledge about computer networks, network devices and their configuration protocols, security concepts at various level etc. PO7. Apply techniques of software validation and reliability analysis to the development of computer programs PO8. Acquire Technical, Communication and management Skills to convey or present information, applications, instructions, policies, procedures, decisions, documentations etc. verbally as well as in writing. <	COBCA102.1	Understand the various approaches dealing the data using theory of Probability
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	professional or as an entrepreneur.
PO11.	Gain expertise in at least one emerging technology.

D. Program Specific Outcomes

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PSO.1.	The student should be able to communicate the technical information both
	orally and in writing professionally.
PSO.2.	Apply Create, select, adapt and apply suitable tools and technologies to a
	wide range of computational activities.
PSO.3.	Acquire necessary knowledge of technical, scientific as well as basic
	managerial and financial procedures to analyze and solve real world
	problems within their work domain
PSO.4	Clarity on both conceptual and application oriented skills in commerce,
	Finance & Accounting and it Applications in Business context.
PSO.5	Ability to analyze research and investigate complex computing problems
	through design of experiments, analysis and interpretation of data and
	synthesis of the information to arrive at valid conclusions.
PSO.6	Apply the knowledge gained in core courses to a broad range of advanced
	topics in computer science, to learn and develop sophisticated technical
	product s independently.
PSO.7	Awareness on ethics, values, sustainability and creativity aspects of
	technical solutions.

E. Pedagogy:

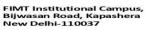
The pedagogy would be the combination of the following techniques:-

- Lectures
- Presentations •
- **Classroom Activities**
- Discussions, Questions & Answers ٠
- Case Study
- **F. Evaluation**

Criteria	Description	Maximum Marks	
Internal Assessment	Mid-Term Exam	10	
	PSDA	5	
	Assignment	10	
External Assessment	End-Term Exam	75	
ΤΟΤΑΙ	TOTAL		

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G. Syllabus

UNIT -I PROBABILITY: Introduction, Axiomatic definition of Probability, Addition Theorem, Multiplication theorem, Conditional Probability, Baye's Theorem and its applications PROBABILITY DISTRIBUTIONS: Random Variable, Probability Mass function, Probability density function, Mathematical Expectations of a Random Variable, Binomial Distribution, Poisson distribution, Normal Distribution.

UNIT -II INTERPOLATION: Operators: Shift; Forward Difference, Backward Difference Operators and their Interrelation, Interpolation Formulae-Newton's Forward, Backward and Divided Difference Formulae: Lagrange's Formula SOLUTIONS OF NON LINEAR EQUATIONS: Bisection Method, False Position Method, Newton - Raphson Method for Solving Equation Involving One Variable only.

UNIT -III SOLUTION OF LINEAR SIMULTANEOUS EQUATIONS: Gaussian Elimination Method with and without Row Interchange: LU Decomposition: Gauss - Jacobi and Gauss-Seidel Method; Gauss – Jordan Method and to find Inverse of a Matrix by this Method. NUMERICAL DIFFERENTIATION: First and Second Order Derivatives at Tabular and Non-Tabular Points, NUMERICAL INTEGRATION: Trapezoidal Rule, Simpsons 1/3 Rule: Error in Each Formula (without proof.)

UNIT -IV PROGRAMMING: Formulation of linear Programming model, Graphical method of solving linear Programming problem, Simplex Method (Maximization and Minimization) TRANSPORTATION & ASSIGNMENT PROBLEM: General structure of transportation problem, solution procedure for transportation problem, methods for finding initial solution, test for optimality. Maximization of transportation problem, unbalanced transportation problem, Assignment problem approach of the assignment model, solution methods of assignment problem, maximization in an assignment, unbalanced assignment problem, restriction on assignment

TEXT BOOKS:

1. S.S. Sastry, "Numerical Analysis"; Prentice Hall of India, 1998.

2. Johnson, R., Miller, I. and Freunds, J., Miller and Freund's "Probability and Statistics for Engineers, Pearson Education (2005) 7th Ed.

. Singh J P "Probability and Numerical Methods" ANE Books, 4th Edition 2019 3.

Sharma, J.K.; Operations Research: problems & solutions; Macmillan India 4.

REFERENCE BOOKS

Grewal B S "Numerical Methods in Engineering and Science" Khanna Publishers, 1. 2012

Walpole, Ronald E., Myers, Raymond H., Myers, Sharon L. and, Keying Ye, 2. Probability and Statistics for Engineers and Scientists, Pearson Education (2007) 8th Ed. 3. Gupta S C, Kapoor V K "Fundamental of Mathematical Statistics" Sultan Chand and

















Sons 11th edition 2002.

4. Manmohan, Gupta, P K, Kanti Swarup "Introduction to Management science operations research" Sultan Chand and Sons

I. Lecture Plan

Lecture No.	Topic(s)	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	PROBABILITY: Introduction, Axiomatic definition of Probability	Lecture	CO1	
2	Addition Theorem, Multiplication theorem, Conditional Probability,	Lecture	CO1	
3	Baye's Theorem and its applications	Lecture	CO2	
4	PROBABILITY DISTRIBUTIONS: Random Variable, Probability Mass function,	Lecture	CO1	
5	Probability density function, Mathematical Expectations of a Random Variable,	Lecture	CO3	
6	Binomial Distribution,	Lecture	CO1	
7	Corporate Level Strategy Poisson distribution,	Lecture	CO4	
8	Normal Distribution	Lecture	CO5	
9	Revision			
10	Class Test			
11	INTERPOLATION: Operators: Shift; Forward Difference, Backward Difference Operators and their Interrelation,	Lecture	CO5	
12	Interpolation Formulae-Newton's Forward,	Lecture	CO1	
13	Backward and Divided Difference Formulae: Lagrange's Formula	Lecture	CO2	
14	SOLUTIONS OF NON LINEAR EQUATIONS: Bisection Method,	Lecture	CO3	
15	False Position Method, Newton	Lecture	CO5	
16	 Raphson Method for Solving Equation Involving One Variable only. 	Lecture	CO3	
17	Revision			
18	Class Test			

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19	SOLUTIONOFLINEARSIMULTANEOUSEQUATIONS:GaussianEliminationMethodwithout Row Interchange:	Lecture	CO1	
20	LU Decomposition: Gauss - Jacobi and Gauss-Seidel Method;	Lecture	CO1	
21	Gauss – Jordan Method and to find Inverse of a Matrix by this Method.	Lecture	CO2	
22	NUMERICAL DIFFERENTIATION: First and Second Order Derivatives at Tabular and Non-Tabular Points,	Lecture	CO1	
23	NUMERICAL INTEGRATION: Trapezoidal Rule,	Lecture	CO3	
24	Simpsons 1/3 Rule: Error in Each Formula (without proof.)	Lecture	CO1	
25	Revision			
26	Class Test			
27	LINEAR PROGRAMMING: Formulation of linear Programming model,	Lecture	CO4	
28	Graphical method of solving linear Programming problem,	Lecture	CO5	
29	Simplex Method (Maximization and Minimization)	Lecture	CO5	
30	TRANSPORTATION&ASSIGNMENTPROBLEM:General structure of transportationproblem,	Lecture	CO1	
31	solution procedure for transportation problem, methods for finding initial solution	Lecture	CO2	
32	test for optimality. Maximization of transportation problem,	Lecture	CO3	
33	unbalanced transportation problem,	Lecture	CO5	
34	Assignment problem approach of the assignment model,	Lecture	CO3	
35	solution methods of assignment problem,	Lecture	CO1	
36	maximization in an assignment,	Lecture	CO2	
37	unbalanced assignment problem,	Lecture	CO1	







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	restriction on assignment		
38	Revision		
39	Class Test		
40	Over all Revision of Syllabus		

J. . Course Articulation Matrix: (Mapping of COs with POs& PSOs)

CO Number	PO	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	SO4	SOO5	SOO6
	1												
COBCA102.1	-	1	1	-	-	-	-						
COBCA102.2	2	2	1	2	1	1	2						
COBCA102.3	2	2	1	1	-	-	1						
COBCA102.4	2	2	2	-	-	-	2						
COBCA102.5	2	2	2	-	-	-	2						
COBCA102.6	3	3	2	-	-	-	2						

"-"- No Correlation; 1-Low Correlation; 2- Moderate Correlation; 3-Substantial *Correlation*

K. Expectations from Students:

Actively participate in the classroom discussions.

Follow the class rules

Must be on time

Must be regular in the class and maintain minimum 75% attendance as per GGSIP University norms)

L. Faculty Contact **Details:**

Name:	Mr. Shashi Kant Tiwari
Designation:	Assisant Professor
Email	shashifimt@gmail.com







FIMT Institutional Campus, Bijwasan Road, Kapashera New Delhi-110037

Tel. - 011-25063208-12 E-Mail - fimtnd@gmail.com







Second Semester

Paper Code: BCA106

Subject: Data Structure and

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Algorithms using C

A. Introduction

Objective: Understanding of the basic concepts of data structures and their operations like, insertion, deletion, searching and sorting and Design algorithms and pseudo codes of various linear and non-linear data structures

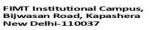
COBCA106.1	Familiarize the basics of data structures and algorithms
CO BCA106.2	Understand and apply linear and nonlinear data structures and their operations.
CO BCA106.3	Compare and implement searching, sorting and hashing techniques.
CO BCA106.4	Appraise and determine the correct data structure for any given real world problem.

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C. Program Outcomes

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PO1.	Understand the fundamental concepts of Computers, Software
	hardware and peripheral devices and evolution of computer
	technologies
PO2.	Familiarized with Business environment and Information Technology
	and its Applications in different domains.
PO3.	Gain knowledge to identify, explain and apply functional
> 0	programming and object-oriented programming techniques and use of
C . 7 .	databases to develop computer programs.
PO4.	Analyze, design, implement and evaluate computerized solutions to
ISO 90	real life problems, using appropriate computing methods including web applications.
PO5.	Understand the front end and backend of software applications.
PO6.	Gain expertise in at least one emerging technology.
PO7.	Apply techniques of software validation and reliability analysis to the development of computer programs.
	development of computer programs.













D. Program Specific Outcomes

PSO.1.	To design, implement, and evaluate computer-based system, process, component, or program to meet desired needs by critical understanding, analysis and synthesis
PSO.2.	Apply Identify applications of Computer Science in other fields in the real world to enhance the career prospects
PSO.3.	Realize the requirement of lifelong learning through continued education and Research.
PSO.4.	Use the concepts of best practices and standards to develop user interactive and abstract application
PSO.5	Understand the professional, ethical, legal, security, social issues and responsibilities

E. Pedagogy:

The pedagogy would be the combination of the following techniques:-

- Lectures
- Presentations
- Classroom Activities
- Discussions, Questions & Answers
- Case Study

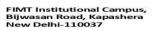
F. Evaluation

Criteria	Description	Maximum Marks		
Internal Assessment	Mid-Term Exam	15		
ISO 9001:	PSDA	1:2015		
	Assignment	5		
External Assessment	External Assessment End-Term Exam			
	TOTAL 100			

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G. Syllabus

Unit-I	: Linear Data Structures- Static (Lectures-12)
a)	Introduction to Algorithms- Attributes, Design Techniques, Time Space Trade Off,
	Data Structures, Classification and Operations of Data Structures.
b)	Arrays: Single Dimension, Two-Dimension and Introduction to Multi Dimensions,
	Memory Representation, Address Calculation, Sparse Matrices- Types, Representation.
c)	Searching and Sorting: Linear and Binary Search, Selection Sort, Bubble Sort,
	Insertion Sort, Merge Sort, Elementary Comparison of Searching and Sorting
	Algorithms.
d)	Hashing: Hash Table, Hash Functions, and Collision Resolution.
	Unit-II: Linear Data Structures- Dynamic (Lecture08)
a)	Introduction: Dynamic Memory Allocation, Dynamic Memory versus Static Memory
u)	Allocation.
b)	Linked List Types: Singly Linked List, Doubly Linked List, Header Linked List,
,	Circular Linked List.
c)	Operations: Creation, Insertion, Deletion, Modification, Searching, Sorting, Reversing,
	and Merging.
	2
	Unit-III: Abstract Data Types: (Lectures-08)
a)	Stacks: Introduction, Static and Dynamic Implementation, Operations, Applications-
	Evaluation and Conversion between Polish and Reverse Polish Notations.
b)	Queues: Introduction, Static and Dynamic Implementation, Operations, Types- Linear
	Queue, Circular Queue, Doubly Ended Queue, Priority Queue.
	Unit-IV: Non Linear Data Structures: (Lectures-12)
a)	Introduction to Graphs: Notations & Terminologies, Representation of Graphs-
	Adjacency Matrix, Incidence Matrix and Linked Representation.
b)	Trees: Notations & Terminologies, Memory Representation, Binary Trees Types-
C	Complete, Full, Strict, Expression Binary Tree, Tree Traversals (Recursive), Binary
	Search Tree and Basic Operations
c)	Introduction and Creation (Excluding Implementation): AVL Tree, Heap Tree, M-
	Way Tree, and B Tree.

H. References

Text Books

- 1. Schaum's Outline Series, "Data Structures", TMH, Special Indian Ed., Seventeenth Reprint, 2014.
- 2. Y. Langsam, M. J. Augenstein and A.M. Tanenebaum, "Data Structures using C and C++", Pearson
- 3. Education India, Second Edition, 2015.

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4. D. Samanta, "Classic Data Structures", PHI, Second Edition, 2009.

References:

- 1. Ashok N kamthane "Introduction to Data Structures in C", Pearson, Third Edition, 2009.
- 2. E. Horowitz and S. Sahni, "Fundamentals of Data Structures in C". Universities Press, Second edition,
- 3. 2008.
- 4. D. Malhotra and N. Malhotra, "Data Structures and Program Design using C", Laxmi Publications,
- 5. Indian adapted edition from Mercury Learning and Information-USA, First edition, 2018.
- 6. Y. Kanetkar "Data Structures through C", BPB Publication, Third Edition, 2019.
- 7. R.F Gilberg, and B A Frouzan- "Data Structures: A Pseudocode Approach with C", Thomson
- 8. Learning, Second Edition, 2004.

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9. K. Rath, and A.K. Jagadev, "Data Structures and Program Design Using C", Scitech Publications, Second Edition, 2011.

Digital Resources

S. No.	Topic/ Title	Source/ URL
1	Linear Data Structures	https://www.geeksforgeeks.org/difference- between-linear-and-non-linear-data-structures/
2	Non-Linear Data Structures	https://www.javatpoint.com/what-is-a-non- linear-data-structure

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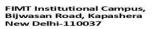
I. Lecture Plan

Lecture No.	Topic(s)	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Linear Data Structures, Introduction to Algorithms	Lecture	CO1	MCQs&Subjective Assessment
2	Attributes, Design Techniques	Lecture	CO1	

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3	Time Space Trade Off	Lecture	CO1	
4	DataStructures,ClassificationandOperationsofStructures.Value	Lecture/ Discussion	CO1	
5	Arrays:SingleDimension,Two-Dimension	Lecture/ Discussion	CO2	
6	Introduction to Multi Dimensions, Memory Representation,	Lecture/ Discussion	CO2	
7	AddressCalculation,SparseMatrices-Types,Representation	Lecture/ Discussion	CO2	
8	Searching and Sorting: Linear and Binary Search,	Lecture	CO3 60	
9	Selection Sort, Bubble Sort,	Lecture/ Discussion	CO3 6	
10	Insertion Sort, Merge Sort,		CO3	
11 तेउ	Elementary Comparison of Searching and Sorting Algorithms	Lecture/ Discussion	ीतम	Fa
12	Hashing:HashTable,HashFunctions,andCollision Resolution.	Lecture/ Discussion	400 ^{CO3} :20	15
13	MCQ			
14	Revision Test	Lecture/	CO2	
15	Linear Data Structures- Dynamic	Lecture/ Discussion	CO2	







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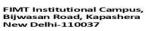




16	Dynamic Memory Allocation,	Lecture/ Discussion	CO4	
17	Dynamic Memory versus Static Memory Allocation.	Lecture/ Discussion	CO4	
18	Introduction Linked List Types: Singly Linked List,	Lecture/ Discussion	CO2	
19	Doubly Linked List, Header Linked List,	Lecture/ Discussion	CO2	
20	Circular Linked List.	Lecture	CO2	
21	Operations: Creation, Insertion, Deletion,	Lecture	CO2	
22	Modification, Searching, Sorting, Reversing, and Merging	Lecture	CO3 6	
23	Continue	Lecture	CO3	
24	MCQ	Lecture/ Discussion	CO3	
25	Revision Test	Lecture/ Discussion	CO3	ਸ਼
26	Abstract Data Types: Stacks: Introduction	Lecture/ Discussion	CO4	15
27	Static and Dynamic Implementation,	Lecture	CO4	
28	Operations, Applications- Evaluation	Lecture/ Discussion	CO4	
29	Conversion between Polish and Reverse Polish Notations.	Lecture	CO4	

















30	Queues: Introduction,	Lecture/	CO2	
31	Static and Dynamic Implementation	Discussion Lecture/ Discussion	CO2	
32	Operations, Types- Linear Queue	Lecture	CO2	
33	Circular Queue,	Lecture/ Discussion	CO4	
34	Doubly Ended Queue,	Lecture	CO4	
35	Priority Queue.	Lecture	CO4	
36	MCQ	Discussion	17 8	
37	Revision Test	Discussion	m C	
38	Non Linear Data Structures: Introduction to Graphs	Lecture/ Discussion	CO2	
39	Notations & Terminologies, Representation of Graphs	Lecture	CO4	
40	Adjacency Matrix, Incidence Matrix	Lecture/ Discussion	CO4	
41	Continue	Lecture	CO4	
42	Linked Representation	Lecture	CO2	r <u>g</u>
48	Trees: Notations & Terminologies, Memory Representation,	Lecture	CO2	15
49	Binary Trees Types- Complete, Full, Strict, Expression Binary Tree	Lecture	CO2	
50	Tree Traversals (Recursive), Binary Search Tree and Basic Operations	Lecture	CO2	

















51	Introduction and	Lecture	CO4	
	Creation :AVL Tree,			
	Heap Tree			
52	M- Way Tree, and B Tree.	Lecture	CO4	
53	Class Test	Discussion		

J. . Course Articulation Matrix: (Mapping of COs with POs& PSOs)

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	SOO5	SOO6
COBALL.B 505.1	N/		C	A	2	R	1	DI	TE	D			
COBALL.B 505.2	2	2	191	2	1	1	2	8	24				
COBALL.B 505.3	2	2	1	1	Tat	1	1	N.		UND			
COBALL.B 505.4	2	2	2	1		4-	2		10	Lon			

"-"- No Correlation; 1-Low Correlation; 2- Moderate Correlation; 3-Substantial Correlation

K. Expectations from Students:

1-1-1-	Actively participate in the classroom discussions
/seminar	न जावयातनरत्

- Follow the class rules Must be on time
- •

Must be on time Must be regular in the class and maintain minimum

75% attendance as per GGSIP University norms)

L. Faculty Contact Details:

Name:	Ms Shweta Rana
Designation:	Asst Professor
Room & Block No.:	Wing B
Email	er.shwetarana1992@gmail.com

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FIMT Institutional Campus, Bijwasan Road, Kapashera New Delhi-110037





6







Code: BCA 108 Subject: DataBase Management System

A. Introduction

Objective: The paper aims to introduce the concept of Back end, data storage in computers, design of a DBMS, Queries to construct database, store and retrieve data from the database. The objective of this course is to provide the learners expertise.

COBCA108.1	Understand the DBMS concepts with detailed architecture,				
	characteristics. Describe different database languages and environment				
	and learn various data models, along with the related terminologies.				
COBCA108.2	Explore Structure Query Language, a brief on NOSQL, Query By				
D.L.A.	Example. Also understand the overview of SQL, and try to implement				
IN A	DDL, DML and DCL along with operators, use of joins, nested query,				
	use of views and Indexes Discuss Integrity Constraints				
COBCA108.3	Describe Relational Data Model, explain Codd's Rules, Relational				
	Algebra, Set theory operations and the concept of functional				
0	dependencies and normalization.				
COBCA108.4	Acquire Knowledge about Transaction Processing, concurrency				
F	problems, and its controlling techniques, Database backup and recovery				
2	and security.				

C. Program Outcomes

land 1	
PO1.	Understand the fundamental concepts of Computers, Software hardware and peripheral devices and evolution of computer technologies
PO2.	Familiarized with Business environment and Information Technology and its Applications indifferent domains.
PO3.	Gain knowledge to identify, explain and apply functional programming and object-oriented programming techniques and use of databases to develop computer programs.
PO4.	Analyze, design, implement and evaluate computerized solutions to real life problems, using appropriate computing methods including web applications.
PO5.	Understand the front end and backend of software applications.
PO6.	Gain expertise in at least one emerging technology.
PO7.	Apply techniques of software validation and reliability analysis to the development of computer programs.
PO8.	Acquire technical skills to lead a productive life in the society as a professional or as an entrepreneur.



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D. Program Specific Outcomes

PSO.1.	To design, implement, and evaluate computer-based system, process, component, or program to meet desired needs by critical understanding, analysis and synthesis
PSO.2.	Apply Identify applications of Computer Science in other fields in the real world to enhance the career prospects
PSO.3.	Realize the requirement of lifelong learning through continued education and Research.
PSO.4.	Use the concepts of best practices and standards to develop user interactive and abstract application
PSO.5	Understand the professional, ethical, legal, security, social issues and responsibilities

E. Pedagogy:

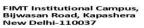
The pedagogy would be the combination of the following techniques:-

- Lectures <
- Presentations
- Classroom Activities
- Discussions, Questions & Answers
- Case Study

F. Evaluation

Criteria	Description	Maximum Marks
Internal Assessment	Mid-Term Exam	15
ने नहित नार	PSDA	5
	Assignment	5
External Assessment	End-Term Exam	75
TOTA	100	















G. Syllabus

Unit-I: (lectures-10)

a) Introduction: An overview of database management system, Characteristics of database approach, DBMS architecture, client/server, data Models, Introduction to Distributed Data processing, schema and instances, data independence

b) Data Modelling using Entity Relationship Model: Basic introduction about the terminologies like Entity, Entity types, entity set, notation for ER diagram, attributes and keys, Types of attributes (composite, derived and multivalued attributes) and keys (Super Key, candidate key, primary key), relationships, relation types, weak entities, enhanced E-R, specialization and generalization.

Unit-II: (lectures-13)

a) Introduction to SQL: Overview, Characteristics of SQL. Advantage of SQL, SQL data types and literals.

b) Types of SQL commands: DDL, DML, DCL. Basic SQL Queries.

c) Logical operators: BETWEEN, IN, AND, OR and NOT

Null Values: Disallowing Null Values, Comparisons Using Null Values

d) Integrity constraints: Primary Key, Not NULL, Unique, Check, Referential key

Introduction to Nested Queries, Correlated Nested Queries, Set-Comparison Operators, Aggregate Operators: The GROUP BY and HAVING Clauses

e) Joins: Inner joins, Outer Joins, Left outer, Right outer, full outer joins.

Overview of other SQL Objects: Views, Sequences, Indexes, Triggers and stored procedure **Unit-III:** (lectures-12)

a) Relational Data Models: Relational model terminology domains, Attributes, Tuples, Relations, characteristics of relations, relational constraints domain constraints, key constraints and constraints on null, relational DB Schema. Codd's Rules

b) Relational algebra: Basic operations selection and projection,

Set Theoretic operations: Union, Intersection, set difference and division (Order, Relational calculus: Domain, Tuple, Well Formed Formula, specification, quantifiers)

c) Join operations: Inner, Outer, Left outer, Right outer, and full outer join.

d) ER to relational mapping: Steps to map ER diagram to relational schema

Data Normalization: Functional dependencies, Armstrong's inference rule, & Normalization (Upto BCNF)

Unit-IV (lectures-9)

a) Transaction Processing: Definition of Transaction, Desirable ACID properties

b) Database recovery and Database Security: System failure, Backup & recovery Techniques, Authentication,

Authorization.

c) Overview of Query by Language, NoSql databses

H. References

Text Books:

1. R. Elmarsi and SB Navathe, "Fundamentals of Database Systems", Pearson, 5th Ed. 2. Singh S.K., "Database System Concepts, design and application", Pearson Education Ramakrishnan and Gherke, "Database Management Systems", TMH.

3. Bipin Desai, "An Introduction to Database Systems", Galgotia Publications, 1991









References:

1. Abraham Silberschatz, Henry Korth, S. Sudarshan, "Database Systems Concepts", 6th Edition, McGraw Hill, 2010

2. Jim Melton, Alan Simon, "Understanding the new SQL: A complete Guide", Morgan Kaufmann Publishers, 1993.

3. A. K. Majumdar, P. Battacharya, "Database Management Systems', TMH, 2017 **Digital Resources**

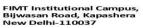
S. No.	Topic/ Title	Source/ URL
1	SQL queries an implementation	https://www.tutorialspoint.com
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I. Lecture Plan

Lecture No.	Topic(s)	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	An overview of database management system, Characteristics of database approach	Lecture	CO1	MCQs & Subjective Assessment
2	DBMS architecture, client/server	Lecture	CO1	
3	data Models	Lecture	CO1	
4	Introduction to Distributed Data processing	Lecture/ Discussion	CO1	
5	schema and instances	Lecture/ Discussion	CO1	ŗ
6	data independence	Lecture/ Discussion	CO1	9
7	Basic introduction about the terminologies like Entity, Entity types, entity set		CO1	
8	Notation for ER diagram	Lecture/ Discussion	CO1	
9	Attributes and keys	Lecture/ Discussion		
10	Types of attributes (composite, derived and multivalued attributes)	Lecture		







Tel. - 011-25063208-12 E-Mail - fimtnd@gmail.com









11	Keys (Super Key, candidate	Lecture	CO1	
	key, primary key)			
12	Relationships, relation types, weak entities, enhanced E-R	Lecture/ Discussion	CO1	
13	Specialization and generalization	Lecture/ Discussion	CO1	
14	MCQ	Discussion	CO1	
15	Revision Test	Discussion	CO1	
16	Overview, Characteristics of SQL. Advantage of SQL	Lecture/ Discussion	CO2	
17	SQL data types and literals	Lecture	CO2	
18	DDL, DML, DCL. Basic SQL Queries	Lecture	CO2	
19	BETWEEN, IN, AND, OR and NOT	Lecture	CO2	
20	DisallowingNullValues,ComparisonsUsingNullValuesValuesValues	Discussion	CO2	
21	Primary Key, Not NULL	Discussion	CO2	
22	Unique, Check, Referential key	Lecture/ Discussion	CO2	
23	Introduction to Nested	Lecture/	CO2	
do	Queries, Correlated Nested Queries	Discussion	तमर	નુ
24	Set-Comparison Operators, Aggregate Operators: The GROUP BY and HAVING Clauses	Lecture/ Discussion	CO2	5
25	Inner joins, Outer Joins, Left outer, Right outer, full outer joins	Lecture	CO2	
26	Overview of other SQL Objects	Lecture/ Discussion	CO2	
27	Views, Sequences, Indexes	Lecture/ Discussion	CO2	













28	Triggers and stored procedure	Lecture/ Discussion	C02	
29	Revision Test	Discussion	CO2	
30	Relational model terminology domains	Lecture/ Discussion	CO3	
31	Attributes, Tuples, Relations	Lecture/ Discussion	CO3	
32	Characteristics of relations	Lecture/ Discussion	CO3	
33	Relational constraints domain constraints	Lecture/ Discussion	CO3	
34	Key constraints and constraints on null	Lecture/ Discussion	CO3	
35	Relational DB schema. Codd's Rules	Lecture/ Discussion	CO3	
36	Basic operations selection and projection	Lecture/ Discussion	CO3	
37	Union, Intersection, set difference and division (Order, Relational calculus: Domain, Tuple, Well Formed Formula, specification, quantifiers)	Lecture/ Discussion	CO3	
38	Inner, Outer, Left outer, Right outer, and full outer join	Discussion		
39	Steps to map ER diagram to relational schema	Lecture/ Discussion	-	
40	Functionaldependencies,Armstrong's inference rule, &Normalization (Upto BCNF)	वधी	CO3	नु
41	Revision Test	Discussion	CO3	5
42	Definition of Transaction, Desirable ACID properties	Lecture/ Discussion	CO4	
43	System failure, Backup & recovery Techniques	Lecture/ Discussion	CO4	
44	Authentication, Authorization.	Lecture	CO4	
45	Overview of Query by Language, NoSql databses	Discussion	CO4	
46	Revision Test	Discussion	CO4	









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J. Course Articulation Matrix: (Mapping of COs with POs& PSOs)

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	SOO5	SOO6
COBCA 108.1	-	1	1	-	2	-	1						
COBCA 108.2	2	2	1	2	1	1	2						
COBCA 108.3	2	2	1	1	-	-	1	-					
COBCA 108.4	2	2	2	A	GE		2		1 10				

"-"- No Correlation; 1-Low Correlation; 2- Moderate Correlation; 3-Substantial Correlation

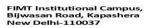
K. Expectations from Students:

Actively participate in the classroom discussions /seminar Follow the class rules Must be on time Must be regular in the class and maintain minimum 75% attendance as per GGSIP University norms) 0

L. Faculty Contact :2015 & 14001:20 **Details:**

Name:	Ms. JYOTI
Designation:	Asst. Professor
Room & Block No.:	Wing B
Email	Jyoti.fimt14@gmail.com















Paper Code BCA 110

Subject: ENVIRONMENTAL STUDIES

A. Introduction

Objective: To develop and acquire the values and attitude towards understanding complex environmental economic-social challenges and active participation in solving current environmental and preventing future ones.

COBCA.110.1	To gain in depth knowledge on natural processes and resources that sustainlife and govern economy			
COBCA.110.2	To understand the consequences of human action on the web of life, global economy and quality of human life			
COBCA.110.3	To develop ability for shaping strategies for environmental protection, conservation of biodiversity, sustainable development			
COBCA.110.4	To adopt sustainability as a practice in life, society and industry			
COBCA.110.5	To have in depth knowledge about legal environment in context of industries.			
COBCA.110.6	Acquire values and attitudes towards understanding complex environmental economic-social challenges, and active participation in solving current environmental problems and preventing the future one			

C. Program Outcomes

PO1.	Critical Thinking: Take informed actions after understanding the legal
	provisions well and identifying the assumptions that frame our thinking and
100.01	actions, checking out the degree to which these assumptions are accurate and
150 90	valid, and looking atour ideas and decisions (intellectual, organizational, and
	personal) from different perspectives.
PO2.	Effective Communication: To improve the communication skills and oratory
	skills through mooting, debating, negotiating and mediation exercises.
PO3.	Social Interaction: Elicit views of others, mediate disagreements and help reach conclusions in group settings.
	rear contractors in 9. or by contractors















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Effective Citizenship: Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of social and legal issues and participate in civic life through volunteering.
Ethics: To inculcate professional ethics and to recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
Environment and Sustainability: Understand the role of Law regarding issues of environmental and sustainable development.
Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio- technological changes

2

D. Program Specific Outcomes

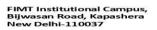
PSO.1.	Ability to link technology with different environmental aspect to have better understanding of environmental problems and their solution.
PSO.2.	Ability to apply various environmental laws in context of various industrial projects.
PSO.3.	Ability to conduct effective research and exploring different environmental issues.
PSO.4.	Clarity on both conceptual and application oriented skills in commerce, Finance & Accounting and it Applications in Business context.
PSO.5	The student should be able to communicate the technical information both orally and in writing professionally in context of environment
PSO.6	Ability to apply ethics, values, sustainability and creativity aspects on environmental problems.

E. Pedagogy:

The pedagogy would be the combination of the following techniques:-

- Lectures
- Presentations Classroom Activities
- Discussions, Questions & Answers
- Case Study

Contest













F. Evaluation

Criteria	Description	Maximum Marks
Internal Assessment	Mid-TermExam	10
	PSDA	5
	Assignment	10
External Assessment	End-TermExam	2 ⁷⁵ ED
69.0	TOTAL	100

G. Syllabus

Unit 1

Introduction to Environmental Studies

• Multidisciplinary nature of environmental studies; components of environment: atmosphere, hydrosphere, lithosphere, and biosphere. • Scope and importance; Concept of sustainability and sustainable development • Emergence of environmental issues: Climate change, Global warming, Ozone layer depletion, Acid rain etc. • International agreements and programmer: Earth Summit, UNFCCC, Montreal and Kyoto protocols, Convention on Biological Diversity(CBD), Ramsar convention, The Chemical Weapons Convention (CWC), UNEP, CITES, etc

UNIT II

Ecosystems and Natural Resources

• Definition and concept of Ecosystem • Structure of ecosystem (biotic and abiotic components); Functions of Ecosystem: Physical (energy flow), Biological (food chains, food web, ecological succession), ecological pyramids and homeostasis. • Types of Ecosystems: Tundra, Forest, Grassland, Desert, Aquatic (ponds, streams, lakes, rivers, oceans, estuaries); importance and threats with relevant examples from India • Ecosystem services (Provisioning, Regulating, Cultural, and Supporting); Ecosystem preservation and conservation strategies; Basics of Ecosystem restoration • Energy resources: Renewable and non-renewable energy sources; Use of alternate energy sources; Growing energy needs; Energy contents of coal, petroleum, natural gas and bio gas; Argo-residues as a biomass energy source

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Unit III



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Biodiversity and Conservation

• Definition of Biodiversity; Levels of biological diversity: genetic, species and ecosystem diversity • India as a mega-biodiversity nation; Biogeographic zones of India; Biodiversity hotspots; Endemic and endangered species of India; IUCN Red list criteria and categories • Value of biodiversity: Ecological, economic, social, ethical, aesthetic, and informational values of biodiversity with examples. • Threats to biodiversity: Habitat loss, degradation, and fragmentation; Poaching of wildlife; Man-wildlife conflicts; Biological invasion with emphasis on Indian biodiversity; Current mass extinction crisis • Biodiversity conservation strategies: in-situ and ex-situ methods of conservation (National Parks, Wildlife Sanctuaries, and Biosphere reserves.

UNIT IV

GEMEN **Environmental Pollution and Control Measures**

• Environmental pollution (Air, water, soil, thermal, and noise): causes, effects, and controls; Primary and secondary air pollutants; Air and water quality standards • Nuclear hazards and human health risks • Solid waste management: Control measures for various types of urban, industrial waste, Hazardous waste, E-waste, etc.; Waste segregation and disposal • Environmental Impact Assessment and Environmental Management System.

Text Books

- 1. TB3. S.P. Mishra, S.N. Pandey; Essential Environmental Studies; Ane Books Pvt. Ltd. ; Sixth Edition
- 2. Asthana, D. K. (2006). Text Book of Environmental Studies. S. Chand Publishing

	ture Io.	Topic(s)	Mode of Delivery	Correspondi ng CO	Mode of Assessing CO
	1 Multi disciplinary nature of environmental studies			CO1	MCQs&Subjecti ve Assessment
	2	continue			
	3	components of environment	Lecture	CO1	
2	4	continue			
	5 scope and importance of environmental studies		Lecture	CO1	

I. Lecture Plan



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	6	continue			
	7	concept of sustainable	Lecture/	CO1,CO6,C0	
		development	Discussio	4	
		-	n		
	8	continue			
	-				
	9	climate change and global	Lecture/	CO2	
		warming	Discussio		
			n		
·	10	continue			
	11	ozone layer depletion and acid	Lecture/	CO2	
		rain	Discussio		
		- AGEI	VI /n		
	12	continue	- N	7	
	12	international environmental	Lecture/	CO5	
	15	protection agreement	Discussio	005	
		protection agreement	n	1	
·	14	continue	ш		E.
				C05	2
	15	international environmental	1	CO5	0
	1.6	protection agreement			
	16	continue		1	5
	17	MCQ			
	18	structure of ecosystem	Lecture/	CO1	
			Discussio		
			n	0	
	19	continue	1E	-	
-	20	types of ecosystem	0	CO1,CO6	
	21	continue			
5	22	different strategies to preserve the	Lecture/	CO3	100
	100	ecosystem	Discussio		SIL
	150	9001:2015	& n 4	001:2	015
	23	continue			
	24	renewable and non renewable	Lecture/	CO3	
		sources of energy	Discussio		
			n		
	25	continue			
	26	IN			
	20	TERNAL ASSESSMENT			
	27				
	27	definition and concept, levels of		CO3,CO6	
l		Biodiversity			

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28	continue			
29	threats to bio diversity	Lecture/	CO3	
30	continue			
31	bio diversity conservation	Lecture/	CO3	
	strategies	Discussio		
		n		
32	continue			
33	environmental air pollution	Lecture/	CO3	
	causes, effects ,control	Discussio		
10.10		n	The second second	
34	continue	KE		
35	water pollution	Lecture/	CO3	
	,causes,effect,control	Discussio	-	
	MA.	n	- CP	
36	continue	L. L. P	1 2	
37	nuclear hazards and human health	Lecture/	CO3	
	risk	Discussio	5	5
1		n		Z
38	continue	12		0
39	solid waste management	Lecture/	CO3,CO4	6
1		Discussio	1	8
	2	n		-
40	continue	-	· · · ·	
41	environment impact assessment	Lecture	,CO4	
42	continue		0	
43	environment management	Lecture	CO3	
	assessment			
	CLASS TEST, REVISION	0		

CO Number	PO1	2	3	04	5	06	07	SO1	SO2	SO3	04	SO05	5006
COBCA.110 .1	1	-	-	-	-	-	1	-	-	1	-	-	-
COBCA.110 2	1	-	-	2	1	1	-	-	-	1	-	-	-
COBCA.110 3	2	-	-	2	1	1	1	-	-	1	-	-	-





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COBCA.110 .4	-	-	-	1	1	2	1	-	-	-	-	-	1
COBCA.110 .5	-	-	-	1	2	-	1	-	2	-	-	-	1
COBCA.110 .6	1	-	1	-	1	-	-	-	-	-		-	1

"-"- No Correlation; 1-Low Correlation; 2- Moderate Correlation; 3-Substantial Correlation

K. Expectations from Students:

- Actively participate in the classroom discussions /seminar
- Follow the class rules
- Must be on time
- Must be regular in the class and maintain minimum 75% attendance as per GGSIP University norms)

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L. Faculty Contact

Details:

Kawaljeet singh Name: **Designation:**

Assistant Professor

स्व नावधं ISO 9001:2015 & 14001:20



FIMT Institutional Campus, Bijwasan Road, Kapashera New Delhi-110037



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Paper Code- BCA 206

206 Subjects: : Introduction to Management and Entrepreneurship Development

A. Introduction

Objective: The course is designed specifically not only to introduce students with key entrepreneurship concepts but also aims to help students to integrate and apply their prior learning to various business situations. The course aims to support BCA program objectives with solid grounding in ethics, globalization and cross-functional issues.

COBCA206.1	Explain the basic concepts, principles and practices associated with Entrepreneurship formulation and implementation.
COBCA206.2	Gain in-depth knowledge on Entrepreneurial development in today's global scenario.
COBCA206.3	Understand the concept of entrepreneurs and to help the students to develop an entrepreneurial mind-set
COBCA206.4	Develop critical thinking for shaping strategies and help them to become an successful entrepreneur
COBCA206.5	Acquire values and attitudes towards understanding complex business problems, and active participation in solving current business problems.
COBCA206.6	Understand the concept of the fundamentals of management

C. Program Outcomes

PO1.	Critical Thinking: Development of critical thinking and to inspire students to developed an entrepreneurial mind-set. Encouraging students to understand the fundamentals of management
PO2.	Effective Communication: Acquire Technical, Communication and management Skills to convey or present information, applications, instructions, policies, procedures, decisions, documentations etc. verbally as well as in writing.
PO3.	Social Interaction: Recognize the various issues related to society, environment, health and vivid cultures and understand the responsibilities to contribute in providing the solutions.

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PO4.	Effective Social Stratification : Promoting active participation in solving current business problems and preventing the future ones.
PO5.	Ethics: Acquire technical skills to lead a productive life in the society as a professional or as an entrepreneur
PO6.	Environment and Sustainability: Formulation, implementation and control in organizations. To help students develop skills for applying these concepts to the solution of Business problems .

D. Program Specific Outcomes

PSO.1.	Understand, interpret, and analysis the facts with the help of entrepreneurship principles.						
PSO.2.	Knowledge to complex problem situations and offer potential solutions within a simulated professional context;						
PSO.3.	Development of critical thinking and to inspire students to developed an entrepreneurial mind-set						
PSO.4	Promoting active participation in solving current business problems and preventing the future ones.						
PSO.5	Understanding of different political, economic, cultural and legal structure of business and make policy accordingly.						
PSO.6	Acquire technical skills to lead a productive life in the society as a professional or as an entrepreneur						

E. Pedagogy:

The pedagogy would be the combination of the following techniques:-

- Lectures
- Presentations
- Classroom Activities
- Discussions, Questions & Answers
- Case Study







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F. Evaluation

Criteria	Description	Maximum Marks
Internal Assessment	Mid-Term Exam	10
	PSDA	5
	Assignment	10
External Assessment	End-Term Exam	75
NAAC A	TOTAL	100

G. Syllabus

UNIT I:

Introduction to Entrepreneurship: Meaning and concept of entrepreneurship, the history of entrepreneurship development, Role of entrepreneurship in economic development, General characteristics and personality traits of entrepreneurs. Factors affecting entrepreneurship, Agencies in entrepreneurship development in India

ANAGEMENT

Agencies in entrepreneurship development in India.

UNIT II:

Creativity: Necessity of Creativity in the development of entrepreneur, Steps in Creativity, Defining Innovation, importance of innovation. Identification of opportunities for problem solving with innovation. Decision making and Problem Solving (steps indecision making). Example from industry, day to day operations

.UNIT III :

Role of an Entrepreneur: The Entrepreneur's role in the context of contribution to society; Examples from industry; the role of changing the mindset and the development of out of box thinking. Introduction to Design Thinking. Entrepreneurs as role models, mentors and influencers. Entrepreneurial success stories. Historical Perspective, Global Indian Entrepreneurs, Institutions, Modern Entrepreneurs:

UNIT IV:

Fundamentals of Management: Meaning of Business and its management the role and importance of leadership in entrepreneurship. Difference between Management and Leadership. The importance of planning in entrepreneurship venture. The role and importance of business plan in entrepreneurship venture







FIMT Institutional Campus, Bijwasan Road, Kapashera New Delhi-110037 Tel. - 011-25063208-12 E-Mail - fimtnd@gmail.com







Suggested Readings:

1. S.S Khanka, Entrepreneurship Development, S.Chand

2. Sangram Keshari Mohanty, Fundamentals of Entrepreneurship, PHI Learning Private Limited 2018

3. Abha Mathur; Entrepreneurship Development, Taxman, Fifth Edition

4. Srivastava S. B: A Practical Guide to Industrial Entrepreneurs; Sultan Chand and Sons, New Delhi.

5. Prasanna Chandra: Protect Preparation, Appraisal, Implementation; Tata McGraw Hill. New Delhi.

6. Chabbra, T.N, Entrepreneurship Development, Sun India

I. Lecture Plan AC ACCREDITED

Lecture No.	Topic(s)	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Course Introduction – : Meaning and concept of entrepreneurship, the history of entrepreneurship development.	Lecture/ case study	COI	
2	Role of entrepreneurship in economic development, General characteristics and personality traits of entrepreneurs.	Lecture	COI	
	Factors affecting entrepreneurship, Agencies in entrepreneurship development in India.	PPT वर्ध & 14		तु
4	Necessity of Creativity in the development of entrepreneur, Steps in Creativity, Defining Innovation, importance of innovation.	Case Study	CO1	
5	Identification of opportunities for problem solving with innovation.	Lecture/ Discussio n	CO3	
6	The Entrepreneur's role in the context of contribution to	Case study	CO1	







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	society;			
7	Introduction to Design Thinking. Entrepreneurs as role models, mentors and influencers.	Case study	CO4	
8	Meaning of Business and its management the role and importance of leadership in entrepreneurship	Case Study	CO5	
9	Difference between Management and Leadership	Lecture/ Discussio n	CO5	
10	The importance of planning in entrepreneurship venture.	Student PPT	CO1	
11	The role and importance of businessplaninentrepreneurship venture	Student PPT	CO2	
12	Entrepreneurial success stories.	Student PPT	CO3/ CO5	
13	Decision making and Problem Solving (steps indecision making). Example from industry, day to day operations		CO5	
	Historical Perspective, Global Indian Entrepreneurs, Institutions, Modern Entrepreneurs:	Lecture/		
15	Revision			
16	Class Test			







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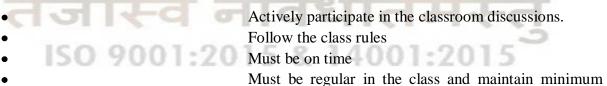


J. . Course Articulation Matrix: (Mapping of COs with POs& PSOs)

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	SO4	SOO5	SOO6
COBCA206. 1	-	1	1	-	-	-	-						
COBCA206. 2	2	2	1	2	1	1	2						
COBCA206. 3	2	2	C	A		R	2	DI	TE	D			
COBCA206. 4	2	2	2	1	V	V	2	8	22				
COBCA206. 5	2	2	2	1	7.7	12	2	1	Chin	UNC			
COBCA206. 6	3	3	2	-	-	1	2			Los			

"-"- No Correlation; 1-Low Correlation; 2- Moderate Correlation; 3-Substantial Correlation

K. Expectations from Students:



75% attendance as per GGSIP University norms)

L. Faculty Contact Details:

Name:	Deepika Kumari
Designation:	Assistant Professor
Room & Block No.:	deepikafimtofficial@gmail.com
Email	

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Paper Code: BCAT214 Subject: Introduction to Artificial Intelligence

A. Introduction

Objective: To learn the basics of designing intelligent agents that can solve general purpose problems. To represent and process knowledge, plan and act, reason under uncertainty and can learn from experiences.

COBCA T214.1	To understand elements constituting problems and learn to solve it by various uninformed and informed (heuristics based)
COBCA T214.2	To understand formal methods for representing the knowledge and the process of inference to derive new representations of the knowledge.
COBCA T214.3	Analyze and apply the notion of uncertainty and some of probabilistic reasoning methods to deduce inferences under uncertainty
COBCA T214.4	Apply some mechanisms to create and improve AI system.

2

C. Program Outcomes

PO1.	Understand the fundamental concepts of Computers, Software hardware and peripheral devices and evolution of computer technologies
PO2.	Familiarized with Business environment and Information Technology and its Applications in different domains.
PO3.	Gain knowledge to identify, explain and apply functional programming and object-oriented programming techniques and use of databases to develop computer programs.
PO4.	Analyze, design, implement and evaluate computerized solutions to real life problems, using appropriate computing methods including web
PO5.	Understand the front end and backend of software applications.
PO6.	Gain expertise in at least one emerging technology.
PO7.	Apply techniques of software validation and reliability analysis to the development of computer programs.

D. Program Specific Outcomes

PSO.1.	To design, implement, and evaluate computer-based system, process, component, or program to meet desired needs by critical understanding, analysis and synthesis
PSO.2.	Apply Identify applications of Computer Science in other fields in the real world to enhance the career prospects
PSO.3.	Realize the requirement of lifelong learning through continued education and Research.

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11 Contest











PSO.4.	Use the concepts of best practices and standards to develop user interactive		
	and abstract application		
PSO.5	Understand the professional, ethical, legal, security, social issues and		
	responsibilities		

E. Pedagogy:

The pedagogy would be the combination of the following techniques:-

- Lectures •
- Presentations •
- Classroom Activities
- Discussions, Questions & Answers
- Case Study •

F. Evaluation

AGEMENT

Criteria	Description	Maximum Marks	
Internal Assessment	Mid-Term Exam	15	
2	PSDA	5	
TSN	Assignment	5	
External Assessment	End-Term Exam	75	
~A	TOTAL	100	
G. Syllabus	REIS		

-	
Unit-I	: Overview of AI (Lectures-12)
a)	Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success.
b)	Problems, problem space and search: Defining the problem as a state space search,
	Production Systems and its characteristics, Issues in the design of the search programs.
c)	Heuristic search techniques: Generate and test, hill climbing, best first search
	technique, problem reduction, constraint satisfaction
Unit-I	I: Knowledge Representation (Lecture08)
a)	Definition and importance of knowledge, Knowledge representation, various approaches used in knowledge representation, Issues in knowledge representation.
b)	Logical Reasoning: Logical agents, propositional logic, inferences, Syntax and
	semantics of First Order Logic, Inference in First Order Logic Knowledge Base,
	forward chaining, backward chaining, unification, resolution, Expert system : Case
	study of Expert system in PROLOG
Unit-I	II: Uncertainty and Natural Language Processing (Lectures-08)
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- a) Handling Uncertainty: Non-Monotonic Reasoning, Probabilistic reasoning, Bayes 'Theorem, Certainty factors and Rule-based Systems, Bayesian Networks, Dempster-Shafer Theory, Introduction to Fuzzy logic. Fuzzy set definition & types. Membership functions. Designing a fuzzy set for a given application
- **b)** Natural Language Processing: Introduction, Syntactic Processing, Semantic Processing, Pragmatic Processing.

Unit-IV: Learning

(Lectures-12)

a) **Learning:** Introduction to Learning, Rote Learning, learning by taking advice, learning in problem solving, learning from examples: Induction, Explanation-based Learning, Discovery, Analogy, Neural Networks, and Genetic Learning.

H. References

Text Books

- 1. Rich and Knight, "Artificial Intelligence", Tata McGraw Hill, 1992.
- 2. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Prentice Hall, Second Edition (Indian Reprint: Pearson Education)

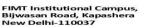
References:

- 1. Ivan brakto :"Prolog Programming for AI ", Addison Wesley
- 2. George F.Luger Artificial Intelligence Pearson Education
- 3. Ben Coppin Artificial Intelligence Illuminated Jones and Bartlett Publisher

Digital Resources

S. No.	Topic/ Title	Source/ URL
1	Artificial Intelligence Introduction	https://www.uc.edu/content/dam/uc/ce/docs/OL LI/Page%20Content/ARTIFICIAL%20INTELL IGENCEr.pdf
2	Knowledge Representation in AI	https://www.javatpoint.com/knowledge- representation-in-ai
3	Learning	https://www.tutorialspoint.com/machine_learnin g_with_python/machine_learning_with_python _types_of_learning.htm















I. Lecture Plan

Lecture	Topic(s)	Mode of	Corresponding	Mode of
No.		Delivery	СО	Assessing CO
1	Introduction to AI,	Lecture	CO1	MCQs &
	Importance of AI, AI and its			Subjective Assessment
	related field,			Assessment
2	AI techniques, Criteria for	Lecture	CO1	
	success.			
3	Problems, problem space and	Lecture	CO1	
	search: Defining the problem as	1500		
	a state space search,	NT.	ę .	
4	Production Systems and its	Lecture/	CO1	
	characteristics,	Discussion	CH I	
5	Issues in the design of the search	Lecture/	CO1	
	programs	Discussion	- 5	
	SN		9	
6	Heuristic search techniques,	Lecture/	CO1	
	× 1/1	Discussion	0	
7	Generate and test, hill climbing	Lecture/	CO1	
		Discussion		
8	Doct first soonsh technique	Loctumo	CO1	
0	Best first search technique,	Lecture		3
IS	problem reduction,	140	01:2015	
9	Constraint satisfaction	Lecture/	CO1	
		Discussion		
10	MCQ		CO3	
11	Revision Test	Discussion		
12	Definition and importance of	Lecture/	CO2	
	knowledge, Knowledge	Discussion		
		Lecture/	CO2	





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13	Various approaches used in	Lecture	CO2	
15		Lecture	02	
	knowledge representation,			
1.4	T · 1 1 1	T ()	602	
14	Issues in knowledge	Lecture/	CO2	
	representation.			
15	Logical Reasoning: Logical	Lecture/	CO2	
	agents,	Discussion		
16	Propositional logic, inferences,	Lecture/	CO2	
		Discussion		
17	Syntax and semantics of First	Lecture/	CO2	
17	Order Logic,	Discussion	002	
	older Lögle,	Discussion		
18	Inference in First Order Logic	Lecture/	CO2	
	Knowledge Base,	Discussion	2	
10			000	
19	Forward chaining, backward	Lecture/	CO2	
	chaining,	Discussion	6	
20	Unification, resolution,	Lecture	CO2	
	2		- G	
21	Expert system : Case study of	Lecture	CO2	
	Expert system in PROLOG			
22	MCQ	Discussion		
	~/RE	EL		
23	Revision Test	Discussion		
24	Handling Uncertainty: Non-	Lecture/	CO3	
CL.	Monotonic Reasoning,	Discussion	1012	
25	A AAAI AAIF	2.4.0	<u> </u>	~
25	Probabilistic reasoning, Bayes	Lecture/	CO3	
	'Theorem,	Discussion		
26	Certainty factors and Rule-based	Lecture/	CO3	
	Systems	Discussion		
	-			
27	Bayesian Networks, Dempster-	Lecture	CO3	
	Shafer Theory,			
28	Introduction to Fuzzy logic.	Lecture/	CO3	
20	Fuzzy set definition & types.	Discussion		
	i <i>ally</i> set definition & types.	2150051011		







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29	Continue	Lecture	CO3
30	Membership functions. Designing a fuzzy set for a given application	Lecture/ Discussion	CO3
31	Natural Language Processing: Introduction	Lecture/ Discussion	CO3
32	Syntactic Processing, Semantic Processing,	Lecture	CO3
33	Pragmatic Processing	Lecture/ Discussion	CO3
34	MCQ	Discussion	
35	Revision Test	Discussion	2 A
36	Learning: Introduction to Learning,	Discussion	CO4
37	Rote Learning		CO4
38	Learning by taking advice,	Lecture/ Discussion	CO4
39	Learning in problem solving,	Lecture	CO4
40	Learning from examples: Induction,	Lecture/ Discussion	CO4
41	Explanation-based Learning,	Lecture	CO4
42	Discovery, Analogy, Neural Networks	Lecture	CO2
48	Genetic Learning	Lecture	CO2
49	MCQ	Discussion	
50	Revision Test	Discussion	















J. Course Articulation Matrix: (Mapping of COs with POs& PSOs)

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	SOO5	SOO6
COBALL.B 505.1	2	1	1	2	-	-	-						
COBALL.B 505.2	2	2	-	2	1	1	-						
COBALL.B 505.3	2	2	1	1	-	-	1						
COBALL.B 505.4	N/	٩A	C	2	GE GE	2	2	DI	TE	D			

"-"- No Correlation; 1-Low Correlation; 2- Moderate Correlation; 3-Substantial Correlation

K. Expectations from Students:

- Actively participate in the classroom discussions /seminar
- Follow the class rules
 - Must be on time
 - Must be regular in the class and maintain minimum

10

75% attendance as per GGSIP University norms)

L. Faculty Contact

Details:

Name:	Ms Shweta Rana	H4-C
Designation:	Asst Professor	3
Room & Block No.:	Wing B	1:2015
Email	er.shwetarana1992@gmail.com	



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BCA Paper Code: BCA 222

Subjects: Digital Marketing

A. Introduction

Objective: To train students at creating an understanding of the concepts and techniques of internet and digital marketing so as to exploit the opportunities of this medium to support the organization's marketing activities. In this course, the students will be able to develop expertise related to understand the basics of Digital Marketing comprehend the importance of Digital Marketing Platforms, gain knowledge about the usefulness of Social Media Marketing (SMM) and Search Engine Optimization (SEO)

COBCA222.1	Understanding the digital marketing concepts and its usefulness in business.
COBCA222.2	Planning steps for digital marketing strategy and successfully executing it.
COBCA222.3	Understand the importance of Social Media Platforms and Social
141	Media Marketing for online communication.
COBCA222.4	Applying Search Engine Optimization techniques (SEO) to maximize
	reach and enhance engagement of users.
COBCA222.5	Analyzing Search Engine Marketing (SEM) types to maximize reach
2	and enhance engagement of users.
COBCA222.6	Analyzing web using analytics tools and gaining insights to various
	tools for Social Media Marketing.

C. Program Outcomes

C. I Togram Outcon	
PO1.	Understand the basic concepts and principles of digital marketing to managing a business successfully
PO2.	Prepare digital marketing strategy and successfully executing it which will be effective for the current business scenario
PO3.	To familiarize the importance of Social Media Platforms and Social Media Marketing for online communication in global context.
PO4.	To expose students to Search Engine Optimization techniques (SEO) and how to maximize reach and enhance engagement of users through Search Engines
PO5.	To enable the students to understand the Search Engine Marketing (SEM) types to maximize reach and enhance engagement of users.
PO6.	To help students in Analyzing web using analytics tools and gaining insights to various tools for Social Media Marketing in the present competitive world

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D. Program Specific Outcomes

PSO.1.	Understand, interpret, and analyse the facts with the help of digital marketing principle.
PSO.2.	Apply legal Knowledge to complex problem situations and offer potential result within a digital marketing strategy and successfully executing it
PSO.3.	Ability to conduct effective communication and develop the critical skill about the Social Media Platforms and Social Media Marketing in organization's matters;
PSO.4	Articulate their independent views over Search Engine Optimization techniques (SEO) and Search Engine Marketing (SEM) in organization.
PSO.5	Understanding of different web using analytics tools and gaining insights to various tools for Social Media Marketing in organization.

E. Pedagogy:

The pedagogy would be the combination of the following techniques:-

- Lectures •
- Presentations
- Classroom Activities
- Discussions, Questions & Answers
- Case Study •

F. Evaluation

Criteria	Description	Maximum Marks
Internal Assessment	Mid-Term Exam	मस्तु
ISO 9001:2015 &	PSDA	1:2015
	Assignment	10
External Assessment	End-Term Exam	75
TOTAL		100





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Web.









G. Syllabus

UNIT I

Digital Marketing Basics: Digital Marketing meaning and its importance, Traditional vs Digital Marketing, Benefits of Digital Marketing, Internet Marketing basics, Digital Marketing channels, Types of Business models, Digital Marketing strategies (P.O.E.M framework), Inbound and Outbound marketing, Digital Transformation model, 4Cs of Digital Marketing **Unit II**

Social Media Marketing – Introduction, Social Media marketing strategies, Overview of Social media platforms – Instagram, Snapchat, Facebook, Mobile, Twitter, Content Planning and Strategy, Influential marketing, Content marketing, Digital Marketing campaign

Unit III

Search Engine Optimization – Introduction to SEO, On-Page and Off-Page Optimization, Role of Keywords in SEO, Organic vs Non-Organic SEO, Blogging as marketing strategy, Types of Blogs Search Engine Marketing – Introduction to Paid marketing, Google Adwords, Types of campaigns and Campaign creation

Unit IV

Tools for SMM and Marketing communication – Overview of Buffer, Hootsuite, Canva, Trello and Hot jar Web Analytics: Meaning, Purpose and process, Types, Tools for analytics – Google analytics, Audience analytics, Acquisition analytics, Behavior analytics, Conversion analytics

Suggested Readings:

TEXT BOOKS:

Rajan Gupta, Supriya Madan, "Digital Marketing", BPB Publication, Ist Edition, 2022 Seema Gupta, "Digital Marketing", McGraw Hill, 2nd Edition, 2018.

Puneet Singh Bhatia, "Fundamentals of Digital Marketing", Pearson, 2nd Edition, 2020.

REFERENCE BOOKS:

Ian Dodson, "The Art of Digital Marketing", Wiley, 2017.

Nitin Kamat, Chinmay Nitin Kamat, "Digital Marketing", Himalaya Publishing House, 1st Edition, 2017.

Vandana Ahuja, "Digital Marketing", Oxford University Press, 8th Edition, 2019.

Judy Strauss, Raymond Frost, "E- Marketing", PHI learning, 5th Edition, 2009.

Moutusy Maity, "Internet Marketing", Oxford University Press, 2018.

Stephanie Diamond, "Digital Marketing", Wiley, 2019.

T. N. Swaminathan, Karthik Kumar, "Digital Marketing From Fundamentals to Future", Cengage, 1st Edition, 2019.







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Lecture Plan

Lecture No.	Topic(s)	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Digital Marketing Basics	Lecture/ Discussion	CO1	
2	Digital Marketing meaning and its importance	Lecture	CO1	
3	Traditional vs Digital Marketing	Lecture/ Discussion	CO1	
4	Benefits of Digital Marketing	Lecture	CO1	
5	Internet Marketing basics	Lecture/ Discussion	CO1	
6	Digital Marketing channels	Lecture/ Discussion	CO1	
7	Types of Business models	Lecture/ Discussion	CO1	
8	DigitalMarketingstrategies(P.O.E.Mframework)	Lecture/ Discussion	CO2	
9	Inbound and Outbound marketing	Lecture/ Discussion	CO2	
10	Digital Transformation model	Lecture/ Discussion	CO2	
11	4Cs of Digital Marketing	Student PPT	CO2	
12	Social Media Marketing – Introduction	Lecture/ Discussion	CO3	
13	Social Media marketing strategies	Lecture/ Discussion	CO3	न्तु
¹⁴ IS	Overview of Social media platforms –	Lecture/ Discussion	CO3	15
15	Instagram, Snapchat	Lecture/ Discussion	CO3	
16	Facebook, Twitter	Lecture/ Discussion	CO3	
17	Mobile	Lecture/ Discussion	CO3	
18	Content Planning and Strategy	Lecture	CO3	
19	Influential marketing	Lecture	CO3	
20	Content marketing	Lecture	CO3	
21	Digital Marketing	Lecture/	CO3	







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	compoign	Discussion		
	campaign		GO 4	
22	Search Engine	Case study	CO4	
	Optimization			
23	Introduction to SEO	Lecture/	CO4	
		Discussion		
24	On-Page and Off-Page	Lecture	CO4	
	Optimization			
25	Role of Keywords in SEO	Lecture/	CO4	
	2	Discussion		
26	Organic vs Non-Organic	Lecture/	CO4	
_	SEO	Discussion		
27	Blogging as marketing	PPT	CO4	
27	strategy	CDE		
28	Types of Blogs	Lecture/	CO4	
20	Types of blogs	Discussion	04	
29	Secret Engine Marketing	the second se	CO5	
	Search Engine Marketing	Lecture		
30	Introduction to Paid	Lecture/	CO5	
	marketing	Discussion		
31	Google Adwords	Lecture/	CO5	
	n	Discussion	- Z	
32	Types of campaigns	Lecture/	CO5 📿	
	II II	Discussion	5	
33	Campaign creation	Lecture/	CO5	
	Z	Discussion		
34	Tools for SMM and	Lecture	CO6	
	Marketing communication			
35	Overview of Buffer	PPT	CO6	
36	Hootsuite, Canva	PPT	CO6	
30	Trello and Hot jar	PPT	CO6	
38	Web Analytics - Meaning,	Lecture/	CO6	
A = A	Purpose	Discussion		
39	Web Analytics - process	Lecture/	CO6	15
1.5	0 2001.201	Discussion	1001.20	1.2
40	Web Analytics - Types	Lecture/	CO6	
		Discussion		
41	Tools for analytics	Lecture/	CO6	
		Discussion		
42	Google analytics	Case study	CO6	
43	Audience analytics	Lecture/	CO6	
_	······································	Discussion		
44	Acquisition analytics	Lecture/	CO6	
	- requisition unury too	Discussion	200	
45	Behavior analytics	Lecture/	CO6	
	Denavior analytics	Discussion		
		Discussion		







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46	Conversion analytics	Lecture/	CO6	
		Discussion		
47	Revision			
48	Class Test			

J. Course Articulation Matrix: (Mapping of COs with POs& PSOs)

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
COBCA222. 1	2	2	1	2	2	1					
COBCA222. 2	2	2	3	² C	ĊF	ł E	DI	TE	D		
COBCA222. 3	2	2	4	T	2	FA 7	54	1			
COBCA222. 4	2	2	2	3	2	1	V	CHM	. 61		
COBCA222. 5	2	2	2	1	1	3		LOG	21.0		
COBCA222. 6	3	3	2	2	1	1	6	k			

"-"- No Correlation; 1-Low Correlation; 2- Moderate Correlation; 3-Substantial

Correlation

K. Expectations from Students:

- Actively participate in the classroom discussions.
- Follow the class rules •
- Must be on time
- 5 Must be regular in the class and maintain minimum 75% attendance as per GGSIP • University norms)

L. Faculty Contact

Details:

Name:	Mr. Azam Khalid
Designation:	Assistant Professor
Room & Block No.:	azamkhalidfimtofficial@gmail.com
Email	

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VI SEMESTER

BCA

Paper Code: BCA

304 Subjects: Mobile Computing

A. Introduction

Objective: • To learn the basics of Wireless voice and data communications technologies. • To build working knowledge on various telephone and satellite networks. • To build skills in working with Wireless application Protocols to develop mobile content applications • To build practical knowledge on WML and WML Script

COBCA304.1	Understand the various approaches dealing the data using theory of Probability
COBCA304.2	Understand various numerical techniques and apply them to solve real life problems
COBCA304.3	Analyse and evaluate the accuracy of common Numerical Methods
COBCA304.4	Develop a mathematical model for real life situation and solving it Using Linear programming technique
C. Program Outc	omes
PO1.	Understand the fundamental concepts of Computers, Software hardware and peripheral devices and evolution of computer technologies.
PO2.	Familiarized with Business environment and Information Technology and its Applications in different domains.
PO3.	Gain knowledge to identify, explain and apply functional programming and object-oriented programming techniques and use of databases to develop computer programs.
PO4.	Analyze, design, implement and evaluate computerized solutions to real life problems, using appropriate computing methods including web applications.
PO5.	Understand the front end and backend of software applications.
PO6.	Acquire knowledge about computer networks, network devices and their configuration protocols, security concepts at various level etc.
PO7.	Apply techniques of software validation and reliability analysis to the development of computer programs
PO8.	Acquire Technical, Communication and management Skills to convey or present information, applications, instructions, policies, procedures, decisions, documentations etc. verbally as well as in writing.
PO9.	Recognize the various issues related to society, environment, health and

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	vivid cultures and understand the responsibilities to contribute in providing the solutions.
PO10.	Acquire technical skills to lead a productive life in the society as a professional or as an entrepreneur.
PO11.	Gain expertise in at least one emerging technology.

D. Program Specific Outcomes

DCO 1	
PSO.1.	The student should be able to communicate the technical information
	both orally and in writing professionally.
PSO.2.	Apply Create, select, adapt and apply suitable tools and technologies
NA/	to a wide range of computational activities.
PSO.3.	Acquire necessary knowledge of technical, scientific as well as basic
	managerial and financial procedures to analyze and solve real world
	problems within their work domain
PSO.4	Clarity on both conceptual and application oriented skills in
0	commerce, Finance & Accounting and it Applications in Business
141	context.
PSO.5	Ability to analyze research and investigate complex computing
	problems through design of experiments, analysis and interpretation of
	data and synthesis of the information to arrive at valid conclusions.
PSO.6	Apply the knowledge gained in core courses to a broad range of
2	advanced topics in computer science to learn and develop sophisticated
	technical products independently.
PSO.7	Awareness on ethics, values, sustainability and creativity aspects of
	technical solutions.
E. Pedagogy:	ARELEY

E. Pedagogy:

The pedagogy would be the combination of the following techniques: -

- Lectures
- Presentations •
- Classroom Activities

-

- Discussions, Questions & Answers •
- Case Study

F. Evaluation

Criteria	Description	Maximum Marks
Internal Assessment	Mid-Term Exam	10
	PSDA	5
	Assignment	10

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External Assessment	End-Term Exam	75
	TOTAL	100

G. Syllabus

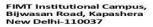
UNIT - I Introduction to wireless communications: Applications, Short History of Wireless Communications, Market of Mobile Communications. [T1] Elementary Knowledge on Wireless Transmission: Frequency of Radio Transmission, Signals, Antennas, Signal Propagation: Path Loss of Radio Signals, Additional Signal Propagation Effects, Multipath Propagation, Multiplexing: Space Division Multiplexing, Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing, Modulation: Amplitude Shift Keying, Frequency Shift Keying, Phase Shift Keying, Advanced Frequency Shift Keying, Advanced Phase Shift Keying, Multicarrier Modulation, Spread Spectrum: Direct Sequence Spread Spectrum, Frequency Hopping Spread Spectrum, Cellular Systems. [T1]

UNIT – **II**Elementary Knowledge on Medium Access Control: Motivation for a specialized MAC, Hidden and exposed terminals, Near and far terminals, Introduction to SDMA, FDMA, TDMA: Fixed TDM, Classical Aloha, Slotted Aloha, Carrier sense multiple access, Demand assigned multiple access, PRMA packet reservation multiple access, Reservation TDMA, Multiple access with collision avoidance, Polling, Inhibit sense multiple access, CDMA, Spread Aloha multiple access, Mobile communications, Comparison of S/T/F/CDMA. [T1] Elementary Knowledge on Telecommunications Systems: GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, New data services, DECT: System architecture, Protocol architecture.[T1] Elementary Knowledge on Satellite systems: History, Applications, Basics: GEO, LEO, MEO, Routing, Localization, Handover. [T1].

UNIT -IIIMobile Internet: Introducing the Mobile Internet, Services for the mobile Internet, Business opportunities.[T2] Implementing WAP Services: WML: WML Variables and Contexts: Variable Substitution, Setting Variables, Browser Contexts, WML Tasks and Events, WML User Interaction: Problems with Web Interaction, Interaction in WAP, Elements:, , The tabindex Attribute, WML Timers, WML Decks, Templates, and Cards: Elements:WML Text and Text Formatting, Elements Character Formatting, Tables, WML Images: The WBMP Image Format. [T2, T3]

UNIT – **IV** WAP: the Mobile Internet Standard, Making the Internet Mobile: Challenges and Pitfalls, Overview of the Wireless Application Protocol [T2] Implementing WAP Services: WML Script: Datatypes, Variables, and Conversions, Operators and Expressions: Operand Conversions, Assignment Operators, Arithmetic Operators, Bitwise Operators, Shift Operators, Logical Operators, Increment and Decrement Operators, Comparison Operators, Type Operators, The Conditional Operator, The Comma Operator, Precedence and Associativity, WMLScript Statements: Expressions as Statements, Blocks of Statements, Conditions, Loops, Returning from a Function, Other Statements, WMLScript Functions: Function Declarations, Function Calls, Calls to Other Script Units, Calling WMLScript from WML, Standard Libraries, WMLScript Pragmas: The access Pragma, The meta Pragma, Elementry Knowledge on Libraries: Lang , Float , String ,URL , WMLBrowser , Dialogs [T2, T3]

















TEXTBOOKS:

[T1] Jochen Schiller, "Mobile Communications", PHI/Pearson Education, Second Edition, 2003.

[T2] Sandeep Singhal, "The Wireless Application Protocol, Writing Applications for Mobile Internet", Pearson Education, 2000

[T3] Learning WML, and WMLScript, Programming the Wireless Web, Martin Frost, Publisher: O'Reilly 2000

REFERENCE BOOKS

[R1] William Stallings, "Wireless Communications and Networks", PHI/Pearson Education, 2002

[R2] Theodore S Rappaport, "Wireless Communication Principles and Practice", 2nd Ed, Pearson Education. 2002

[R3] C. Y. Lee and William, "Mobile Cellular Telecommunications", 2nd Ed, McGraw Hill. 2001

Mode of Assessing Lecture Topic(s) Mode of Correspondin Delivery No. g CO CO CO1 1 Introduction to wireless Lecture communications: Applications, Short History of Wireless Communications, Market Mobile of Communications. [T1] Elementary Knowledge on 2 Lecture/ppt **CO1** Wireless Transmission: Frequency of Radio Transmission, Signals, Antennas, 3 Signal Propagation: Path Lecture CO₂ Loss of Radio Signals, 4 Additional **CO1** Signal Lecture Propagation Effects. Multipath Propagation, 5 Multiplexing: Space Lecture/ppt CO3 Division Multiplexing, Frequency Division

I. Lecture Plan







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	Multiplexing, Time			
	Division Multiplexing,			
	Code Division			
	Multiplexing, Modulation:			
6	Amplitude Shift Keying,	Lecture	CO1	
0	Frequency Shift Keying,	Lecture	COI	
	Phase Shift Keying,			
7	Advanced Frequency Shift	Lecture/ppt	CO4	
/	Keying, Advanced Phase	Lecture, ppt	04	
	Shift Keying, Multicarrier			
8	Modulation,	Lecture	CO5	
0	SpreadSpectrumDirect	Lecture	005	
	Sequence Spread	000	The second second second second	
	Spectrum, Frequency	CKE	DIIEL	0
	Hopping Spread Spectrum,			
	Cellular Systems. [T1]	EMEN	>	
	Central Systems. [11]		8	
9	Revision		1	
10	Class Test		2	
10	Elementary Knowledge on	Lecture	CO5	
11	Medium Access Control:	Lecture	05	
	Motivation for a		22	
	specialized MAC, Hidden	1. Alt	O D	
	and exposed terminals,		9	
	Near and far terminals, [T1		X	
12	Introduction to SDMA,	Lecture/ppt	CO1	
12	FDMA, TDMA: Fixed	Lecture/ppt	COI	
	TDMA, TDMA. TAKE		-	
13	Classical Aloha, Slotted	Lecture	CO2	
15	Aloha, Carrier sense	Lecture	002	
	multiple access,	तर्श		
14		Lecture	CO3	
14	access, PRMA packet		the second se	15
12	reservation multiple access,	0.6.14	001:20	1.2
15	Reservation TDMA,	Lecture/ppt	CO5	
	Multiple access with	······································		
	collision avoidance,			
	Polling, Inhibit sense			
	multiple access,			
16	CDMA, Spread Aloha	Lecture/	CO3	
	multiple access, Mobile	case study		
	communications,	-		
	Comparison of			
	S/T/F/CDMA.			
17	New data services, DECT:	Lecture	CO1	
L				







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	Systemarchitecture,Protocol architecture.[T1]			
18	Elementary Knowledge on Satellite systems: History, Applications, Basics: GEO, LEO, MEO, Routing, Localization, Handover.	Lecture	CO2	
19	Revision			
20	Class Test			
21	MobileInternet:IntroducingtheMobileInternet,ServicesformobileInternet,Business	Lecture	CO1	
	opportunities.[T2],	ORE	DUIER	
22	ImplementingWAPServices:WML:VariablesandContexts:Variable Substitution,	Lecture/ case study	CO1	
23	Setting Variables, Browser Contexts, WML Tasks and Events,	Lecture	CO2	
24	WML User Interaction: Problems with Web Interaction, Interaction in WAP,,	Lecture	COI	
25	Elements:, , The tabindex Attribute, WML Timers, WML Decks, Templates, and Cards: Elements' Text	Lecture/ case study	CO3	
	and Text Formatting,	2.9	201	
26	Elements Character Formatting, Tables, WML Images: The WBMP Image Format	Lecture	001:20	1 5
27	Revision			
28	Class Test			
29	WAP: the Mobile InternetStandard, Making theInternetMobile:Challenges and Pitfalls,Other Statements,	Lecture	CO4	
30	Overview of the WirelessApplication Protocol [T2]ImplementingWAPServices:WMLScript:	Lecture	CO5	







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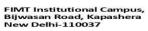






	Datatypes, Variables, and			
31	Conversions, Operators and Expressions:	Lecture	CO5	
	Operand Conversions,			
	Assignment Operators,			
	Arithmetic Operators, Bitwise Operators, Shift			
	Operators, Sint			
32	Logical Operators,	Lecture/	CO1	
	Increment and Decrement	case study		
	Operators, Comparison			
	Operators, Type Operators,		2.2.5	
33	The Conditional Operator,	Lecture	CO2	
	The Comma Operator, Precedence and			
	Precedence and Associativity,	EMEN	~	
34	test for optimality.	Lecture	CO3	
	Maximization of		10	
	transportation problem,		2.0	
35	WMLScript Statements:	Lecture	CO5	
	Expressions as Statements,	13.2	2 0	
	Blocks of Statements, Conditions, Loops,	EN .	5	
	Conditions, Loops, Returning from a Function,		a a	
36	WMLScript Functions:	Lecture/	CO3	
	Function Declarations,	case study		
	Function Calls, Calls to		0	
	Other Script Units, Calling	JA & T	-	
37	WMLScript from WML,	Lecture	CO1	
38	Standard Libraries,	Lastura	CO2	
38	WMLScript Pragmas: The access Pragma, The meta	Lecture	CO2	
	Pragma,		0.01 0.0	2
39	Elementry Knowledge on	Lecture	CO1	15
	Libraries: Lang, Float,			
	String ,URL ,			
	WMLBrowser, Dialogs			
40	Revision			
41	Class Test			
42	Over all Revision of			
	Syllabus			







वन्दे-शक्ति









J. .Course Articulation Matrix: (Mapping of COs with POs& PSOs)

CO Number	PO	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	SO4	SOO5	SOO6
	1												
COBCA102.1	-	1	1	-	-	-	-						
COBCA102.2	2	2	1	2	1	1	2						
COBCA102.3	2	2	1	1	-	-	1						
COBCA102.4	2	2	2	-	-	-	2						
COBCA102.5	2	2	2	A.	CC	R	2	DI	TE	D			
COBCA102.6	3	3	2	AR	GE	IVI 2	2	7 -					

"-"- No Correlation; 1-Low Correlation; 2- Moderate Correlation; 3-Substantial Correlation

K. Expectations from Students:

- Actively participate in the classroom discussions.
 - Follow the class rules.
 - Must be on time
- Must be regular in the class and maintain minimum
 - 75% attendance as per GGSIP University norms)

L. Faculty Contact Details:	व नावधीतमस्तु
Name:	Mr. Shashi Kant Tiwari
Designation:	Assisant Professor
Email	shashifimt@gmail.com









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Fourth Semester

BCA

Paper Code: BCA306

Subject: Linux Environment

A. Introduction

Objective: To understand Linux Operating System and its security.

COBCA106.1	Familiarize the basics of Linux and Unix Operating System.
CO BCA106.2	Understand and apply some Linux commands and its environment.
CO BCA106.3	Compare and implement environment and local variables.
CO BCA106.4	Understand the process related commands and Linux kernel.

C. Program Outcomes

PO1.	Understand the fundamental concepts of Computers, Software
	hardware and peripheraldevices and evolution of computer
	technologies
PO2.	Familiarized with Business environment and Information
	Technology and its Applications indifferent domains.
PO3.	Gain knowledge to identify, explain and apply functional
	programming and object-orientedprogramming techniques and use
	of databases to develop computer programs.
PO4.	Analyze, design, implement and evaluate computerized solutions
	to real life problems, using appropriate computing methods
	including web applications.
PO5.	Understand the front end and backend of software applications.
PO6.	Gain expertise in at least one emerging technology.
PO7.	Apply techniques of software validation and reliability analysis to
	the development of computer programs.
D Dragnom Crasif	a Outroomag

D. Program Specific Outcomes

PSO.1.	To design, implement, and evaluate computer-based system, process, component, or program to meet desired needs by critical understanding, analysis and synthesis
PSO.2.	Apply Identify applications of Computer Science in other fields in the real world to enhance the career prospects
PSO.3.	Realize the requirement of lifelong learning through continued

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	education and Research.
PSO.4.	Use the concepts of best practices and standards to develop user interactive and abstract application
PSO.5	Understand the professional, ethical, legal, security, social issues and responsibilities

E. Pedagogy:

The pedagogy would be the combination of the following techniques:-

- Lectures
- Presentations
- Classroom Activities
- Discussions, Questions & Answers
- Case Study

F. Evaluation

Criteria	Description	Maximum Marks		
Internal Assessment	Mid-Term Exam	15		
	PSDA	5		
	Assignment	5		
External Assessment	End-Term Exam	75		
	TOTAL			

G. Syllabus

Unit-I: LINUX AND UNIX(Lectures-12)

- a) Overview of UNIX and LINUX Architectures, UNIX Principles,
- b) GNU Project/FSF,GPL,Getting help in Linux with –help,whatis,man command, info command, simple commands like date,whoami, who, w, cal, bc ,hostname,uname, concept of aliases etcLinux filesystem types ext2, ext3, ext4,
- c) Basic linux directory structure and the functions of different directories basic directory navigation commands like cd, mv, copy,rm,cat command, less command, runlevel









Unit-II: Standard Input and Output(Lecture08)

- a) Redirecting input and Output, Using Pipes to connect processes, tee command,
- b) Linux File Security, permission types, examining permissions, changing permissions(symbolic method numeric method), default permissions and umask Vi editor basics.
- c) Three modes of vi editor, concept of inodes, inodes and directories, cp and inodes, my and inodesrm and inodes, symbolic links and hard links, mount and umount command, creating archives, tar, gzip, gunzip, bzip2, bunzip2

Unit-III: Environment and Local Variable(Lectures-08)

- a) Enivironment variables(HOME,LANG,SHELL,USER,DISPLAY,VISUAL),
- b) Local variables, concept of /etc/passwd, /etc/shadow, /etc/group, and su- command,
- c) Special permissions(suid for an executable, sgid for an executable, sgid for a directory, sticky bit for a directory) tail, wc, sort, uniq, cut, tr, diff, aspell, basic shell scripts grep, sed, awk

Unit-IV: Process Related Commands(Lectures-12)

- a) Process related commands(ps, top, pstree, nice, renice),
- b) Introduction to the linux Kernel, getting started with the kernel(obtaining the kernel source, installing the kernel source, using patches,
- c) The kernel source tree, building the kernel process management(process descriptor and the task structure, allocating the process descriptor, storing the process descriptor, process state,
- d) Manipulating the current process state, process context, the process family tree, the Linux scheduling algorithm, overview of system calls, Intoduction to kernel debuggers.

H. References

Text Books

- 1. Sumitabha Das, "Unix Concepts and Application", TMH
- 2. Robert Love, "Linux Kernel Development", Pearson Education
- 3. Sumitabha Das, "Your Unix The Ultimate Guide", TMH



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References:

- 1. Sivaselvan, Gopalan, "A Beginner's Guide to UNIX", PHI Learning
- 2. The Unix Programming Environment by Brian W. Kernighan and Rob Pike, PHI
- 3. Understanding the Linux Kernel Daniel P. Bovet; Marco Cesati, O'Reilly Media, Inc. 2005

Digital Resources

S. No.	Topic/ Title	Source/ URL
1	Linux and Unix OS	https://www.tutorialspoint.com/unix/unix- getting-started.htm
2	Linux commands and variables	https://www.tutorialspoint.com/unix/unix-using- variables.htm

I. Lecture Plan

Lecture No.	Topic(s)	Mode of Delivery	Corresponding CO	Mode of Assessing CO
1	Overview of UNIX and LINUX Architectures,	Lecture	CO1	MCQs&Subjective Assessment
2	UNIX Principles,GNU Project/FSF	Lecture	CO1	
3	GPL,Getting help in Linux with —help,whatis,man command, info command,	Lecture	CO1	
4	Simple commands like date,whoami, who, w, cal, bc ,hostname,uname,	Lecture/ Discussion	CO1	
5	Concept of aliases	Lecture/ Discussion	CO1	
6	Linux filesystem types ext2, ext3, ext4,	Lecture/ Discussion	CO1	
7	Basic linux directory structure	Lecture/ Discussion	CO1	
8	The functions of different directories	Lecture	CO1	
9	Basicdirectory navigation	Lecture/	CO1	
	The FIMT Alumni Association	न्दे-शकित	হাপ্থি	तम्







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	commands like cd, mv, copy,rm,cat command , less	Discussion		
	command, runlevel			
10	Continue		CO1	
11	Difference between Linux and Unix	Lecture/ Discussion	CO1	
12	MCQ	Discussion		
13	Revision Test	Discussion		
14	Redirecting input and Output, Using Pipes to connect processes, tee command,	Lecture/	CO2	
15	Linux File Security, permission types,	Lecture/ Discussion	CO2	
16	Examining permissions, changing permissions	Lecture/ Discussion	CO2	
17	Default permissions and umask Vi editor basics,	Lecture/ Discussion	CO2	
18	Three modes of vi editor	Lecture/ Discussion	CO2	
19	Concept of inodes, inodes and directories, cp and inodes	Lecture/ Discussion	CO2	
20	mv and inodesrm and inodes,symbolic links and hard links,mount and umount command,	Lecture	CO2	
21	Creating archives, tar,gzip,gunzip,bzip2,bunzip2	Lecture	CO2	
22	Continue	Lecture	CO2	
23	MCQ	Discussion		
24	Revision Test	Discussion		
25	Enivironment variables(HOME,LANG,SHE LL,USER,DISPLAY,VISUAL),	Lecture/ Discussion	CO3	
26	Local variables, concept of /etc/passwd, /etc/shadow, /etc/group,and su- command,	Lecture/ Discussion	CO3	
27	Continue	Lecture/ Discussion	CO3	
28	Special permissions(suid for	Lecture/	CO3	



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	an executable, sgid for an executable, sgid for a directory, sticky bit for a directory)	Discussion		
29	Continue	Lecture	CO3	
30	tail, wc, sort, uniq, cut, tr, diff, aspell, basic shell scripts grep, sed, awk	Lecture/ Discussion	CO3	
31	Continue	Lecture/ Discussion	CO3	
32	MCQ	Discussion		
33	Revision Test	Discussion		
34	Process related commands(ps, top, pstree, nice, renice),	Lecture/ Discussion	CO4	
35	Introduction to the linux Kernel, getting started with the kernel	Lecture/ Discussion	CO4	
36	Installing the kernel source, using patches, the kernel source tree	Lecture/ Discussion	CO4	
37	Building the kernel process management(process descriptor and the task structure	Lecture/ Discussion	CO4	
38	Allocating the process descriptor, storing the process descriptor, process state	Lecture/ Discussion	CO4	
39	Manipulating the current process state, process context	Lecture/ Discussion	CO4	
40	The process family tree, the Linux scheduling algorithm, overview of system calls,	Lecture/ Discussion	CO4	
41	Introduction to kernel debuggers	Lecture/ Discussion	CO4	
42	MCQ	Discussion		
48	Revision Test	Discussion		
49	Class Test	Discussion		



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J. Course Articulation Matrix: (Mapping of COs with POs& PSOs)

CO Number	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	SOO5	SOO 6
COBALL.B 505.1	-	1	1	-	2	-	1						
COBALL.B 505.2	2	2	1	2	1	1	2						
COBALL.B 505.3	2	2	1	1	-	-	1						
COBALL.B 505.4	2	2	2	1	1	-	2						

"-"- No Correlation; 1-Low Correlation; 2- Moderate Correlation; 3-Substantial Correlation

K. Expectations from Students:

- Actively participate in the classroom discussions
- /seminar
- Follow the class rules
 - Must be on time
 - Must be regular in the class and maintain minimum
 - 75% attendance as per GGSIP University norms)

L. Faculty Contact **Details:**

Name:	Ms. Shweta Rana
Designation:	AsstProfessor
Room & Block No.:	Wing B
Email	er.shwetarana1992@gmail.com





NCC

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Paper Code: BCA 312 Subjects: Artificial Intelligence

A. Introduction

Objective: To understand the concept of Artificial Intelligence, Knowledge Representation, Logic, NLP and Learning.

COBCA102.1	Understand the various approaches dealing the data using theory of Artificial Intelligence
COBCA102.2	Understand various numerical techniques and apply them to solve real
IN 11 (10)	life problems
NA/	AC ACCREDITED
COBCA102.3	Analyse and evaluate the accuracy of Knowledge Representation
COBCA102.4	Develop a mathematical model for real life situation and solving it
4	Using, Logic, NLP and Learning.
C. Program Outcom	les

C. Program Outcomes

	T
PO1.	Understand the fundamental concepts of Computers, Software hardware and peripheral devices and evolution of computer technologies.
PO2.	Familiarized with Business environment and Information Technology and its Applications in different domains.
PO3.	Gain knowledge to identify, explain and apply functional programming and object-oriented programming techniques and use of databases to develop computer programs.
PO4.	Analyze, design, implement and evaluate computerized solutions to real life problems, using appropriate computing methods including web applications.
PO5.	Understand the front end and backend of software applications.
PO6.	Acquire knowledge about computer networks, network devices and their configuration protocols, security concepts at various level etc.
PO7.	Apply techniques of software validation and reliability analysis to the development of computer programs
PO8.	Acquire Technical, Communication and management Skills to convey or present information, applications, instructions, policies, procedures, decisions, documentations etc. verbally as well as in writing.
PO9.	Recognize the various issues related to society, environment, health and vivid cultures and understand the responsibilities to contribute in
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	providing the solutions.
PO10.	Acquire technical skills to lead a productive life in the society as a professional or as an entrepreneur.
PO11.	Gain expertise in at least one emerging technology.

D. Program Specific Outcomes

PSO.1.	The student should be able to communicate the technical information
- ~	both orally and in writing professionally.
PSO.2.	Apply Create, select, adapt and apply suitable tools and technologies
	to a wide range of computational activities.
PSO.3.	Acquire necessary knowledge of technical, scientific as well as basic
IN/A/	managerial and financial procedures to analyze and solve real world
	problems within their work domain
PSO.4	Clarity on both conceptual and application oriented skills in
	commerce, Finance & Accounting and it Applications in Business
0	context.
PSO.5	Ability to analyze research and investigate complex computing
54	problems through design of experiments, analysis and interpretation of
Ĕ	data and synthesis of the information to arrive at valid conclusions.
PSO.6	Apply the knowledge gained in core courses to a broad range of
ŝ	advanced topics in
21	computersciencetolearnanddevelopsophisticatedtechnical products
	independently.
PSO.7	Awareness on ethics, values, sustainability and creativity aspects of
	technical solutions.
E. Pedagogy:	RELEY

E. Pedagogy:

The pedagogy would be the combination of the following techniques:-

- Lectures
- PresentationsClassroom Activities
- Discussions, Questions & Answers •
- Case Study

F. Evaluation

Criteria	Description	Maximum Marks
Internal Assessment	Mid-Term Exam	10
	PSDA	5

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15







	Assignment	10
External Assessment	End-Term Exam	75
Т	OTAL	100

G. Syllabus

UNIT - I Overview of A.I: Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success. Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem. Heuristic search techniques: Generate and test, hill climbing, best first search technique, problem reduction, constraint satisfaction.

UNIT - II Knowledge representation: Definition and importance of knowledge, Knowledge representation, various approaches used in knowledge representation, Issues in knowledge representation. Using Predicate Logic: Represent ting Simple Facts in logic, representing instances and is-a relationship, Computable function and predicate.

UNIT - **III** Natural language processing: Introduction syntactic processing, Semantic processing, Discourse, and pragmatic processing. Learning: Introduction learning, Rote learning, learning by taking advice, learning in problem solving, Learning from example-induction, Explanation based learning.

UNIT - IV Expert System: Introduction, Representing using domain specific knowledge, Expert system shells. LISP and other AI Programming Language

TEXTBOOKS:

[T1] E. Rich and K. Knight, "Artificial intelligence", TMH, 2nd ed., 1999.

REFERENCE BOOKS

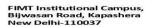
[R1] D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1999

[R2] Nils J Nilsson, "Artificial Intelligence - A new Synthesis" 2nd Edition (2000),

Harcourt Asia Ltd.

I. Lecture Plan 9001:2015 & 14001:2015

Lecture	Topic(s)	Mode of	Corresponding	Mode of Assessing
No.		Delivery	СО	СО
1	Overview of A.I: Introduction to AI, ,	Lecture	CO1	
2	Importance of AI, AI and its related field	Lecture	CO1	
3	AI techniques, Criteria for success. Problems, problem	Lecture	CO2	



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	space and search:			
	space and search.			
4	Defining the problem as a state space search	Lecture	CO1	
5	Production system and its characteristics,	Lecture	CO3	
6	Issues in the design of the search problem.	Lecture	CO1	
7	Heuristic search techniques:	Lecture	CO4	
8	Generate and test, hill climbing,, best first search technique, problem reduction, constraint satisfaction	Lecture	CO5	
9	Revision	12/1	101	
10	Class Test		200	
11	Knowledge representation: Knowledge representation,	Lecture	CO5	
12	Definition and importance of knowledge,	Lecture	CO1	
13	various approaches used in knowledge representation,	Lecture	CO2	म्तु
14 2	Issues in knowledge representation.	Lecture	CO3	1.2
15	Using Predicate Logic: Represent ting Simple Facts in logic,	Lecture	CO5	
16	Computable function and predicate.	Lecture	CO3	
17	Revision			







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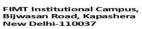






18	Class Test			
19	Naturallanguageprocessing:: Learning fromexample-induction,Explanationbasedlearning.	Lecture	CO1	
20	Introduction syntactic processing,	Lecture	CO1	
21	Discourse, and pragmatic processing	Lecture	CO2	
22	Semantic processing,. Learning	Lecture	CO1	
23	Introduction learning, Rote learning,	Lecture	CO3	
24	learning by taking advice, learning in problem solving,	Lecture	COI	
25	Revision		201	
26	Class Test		1	
27	Expert System	Lecture	CO4	
28	Introduction, Representing using domain specific knowledge,	Lecture	CO5	
29	Expert system shells.	Lecture	CO5	rg
30	LIPS	Lecture	CO1	15
31	AI Programming Language	Lecture	CO2	
32	Revision			
33	Class Test			
34	Over all Revision of Syllabus			















J. Course Articulation Matrix: (Mapping of COs with POs& PSOs)

CO Number	PO	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	SO4	SOO5	SOO6
	1												
COBCA102.1	-	1	1	-	-	-	-						
COBCA102.2	2	2	1	2	1	1	2						
COBCA102.3	2	2	1	1	-	-	1						
COBCA102.4	2	2											
COBCA102.5	2	2	C^2	A	CC	R	2	Dľ	TE	D			
COBCA102.6	3	3	2	A	GE	NI Ł	2	4					

"-"- No Correlation; 1-Low Correlation; 2- Moderate Correlation; 3-Substantial Correlation

Follow the class rules

Actively participate in the classroom discussions.

C

K. Expectations from Students:

- Must be on time Must be regular in the class and maintain minimum
- 75% attendance as per GGSIP University norms)

L. Faculty Contact

Details:

Name:	Mr. Shashi Kant Tiwari
Designation:	Assisant Professor
Email	shashifimt@gmail.com



