Course Teaching Plan

Annexure IV-H

JAGAN INSTITUTE OF MANAGEMENT STUDIES

3, Institutional Area, Sector-5, Rohini, Delhi-110085

Course: **MCA**

Paper Code- **MCA-263**

Subject: **Artificial Intelligence and Machine Learning Lab**

Lesson Plan

Unit No.	Topic	Duration	Text Book	Reference Book	CO Mapping	BTL	PO	Learning Outcome
1	Knowledge Representation and Reasoning, Breadth First Search, Depth First Search, Best First Search, A*, AO*	5 hrs	TB1 (Ch-1 – Ch- 6)	RB1	CO1: Apply heuristic search based algorithms to solve different puzzles CO2: Identify reduction techniques on large datasets and reduce their dimensionality. CO5: Implement the knowledge of inference rules to	BTL 3	PO1, PO2, PO3,PO4, PO5, PO6, PO10	After completing this unit, learners will be able to: 1. Apply various AI search techniques such as hill climbing, breadth-first search, depth-first search, best-first search, A*, AO*, and constraint satisfaction to solve problems.

					design the knowledge base			
2	**Unit 2** – Exploratory Data Analysis – Describing data using statistical tools, Data Visualization	5 hrs	TB1 (Ch- 7 – Ch-9) TB1 (Ch- 12 - Ch- 14)	RB1, RB3 RB2	CO2: Identify reduction techniques on large datasets and reduce their dimensionality	BTL3	PO1, PO2, PO3,PO4, PO5	After completing this unit, learners will be able to: 1. Apply appropriate Data analytics techniques to describe the data and infer from it. 2. Apply appropriate Data Visualization techniques to represent the data. 3. Identify python library for the implementation of Data Visualization, and analytics.
3	Supervised Machine learning techniques - Regression and Classification	6 hrs	TB1 (Ch -18) TB2 (Ch- 2 - Ch- 5)	RB4	CO3: Analyse the datasets for bias and apply appropriate regression techniques. CO4: Evaluate the learning techniques for classification. CO6: Create a domain specific intelligent application	BTL4	PO1, PO2, PO3,PO4, PO5, PO6, PO7, PO9, PO10, PO11, PO12	Upon completing this unit, learners will be able to: 1. Describe the basics of machine learning and its significance. 2. Classify different types of machine learning problems and their applications. 3. Define supervised machine learning and explain regression and classification problems.

								4. Apply regression techniques, including simple and multiple regression, to predict outcomes. 5. Understand logistic regression and its role in classification tasks. 6. Evaluate model accuracy using techniques like coefficient of determination, correlation, and confusion matrix. 7. Explain concepts of overfitting, underfitting, bias, and variance in machine learning models.
4	Unsupervised Learning – PCA, Clustering, Neural Network Algorithm, Recommender Systems, Content based recommendations.	6 hrs	TB1 (Ch -18) TB2 (Ch - 10,14, 16) TB3 (Ch 6, 10)	RB4	CO3: Analyse the datasets for bias and apply appropriate regression techniques. CO4: Evaluate the learning techniques for classification. CO6: Create a domain specific	BTL4	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO9, PO10, PO11, PO12	After completing this unit, learners will be able to: 1. Describe dimensionality reduction techniques, particularly Principal Component Analysis (PCA). 2. Apply K-means clustering for unsupervised data grouping.

					intelligent application			3. Explain the concepts of boosting and bagging in ensemble learning. 4. Define neural networks, including activation functions, feedforward architecture, and the backpropagation algorithm. 5. Discuss different types of neural networks and their applications. 6. Understand the basics of recommender systems, both content-based and collaborative filtering.

TEXT BOOKS

[TB1] Stuart Russel, and Peter Norvig, "Artificial intelligence: A Modern Approach", Pearson Education Limited, 4th Edition, 2020.

[TB2] T. Hastie, R. Tibshirani and J. Friedman, "The Elements of Statistical Learning: Data Mining, Inference, and Prediction", Springer, 2nd Edition, 2017.

[TB3] Richard O. Duda, Peter E. Hart and David G. Stork, "Pattern Classification", Wiley, 2nd Edition, 2012.

REFERENCE BOOKS

[RB1] E. Rich, K. Knight. S. B. Nair, "Artificial Intelligence", McGraw-Hill Publishing Company Limited, New Delhi, 3rd Edition, 2017.

[RB2] Mark Watson, "Practical Artificial Intelligence Programming with Java", Leanpub, 5th Edition, 2020.

[RB3] Ivan Bratko, "Prolog Programming for Artificial Intelligence", Pearson Education, 5th Edition, 2011.

[RB4] Tom M. Mitchell, "Machine Learning", McGraw-Hill Education, Indian Edition, 2017.

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Course Code : MCA-103
Course Name : Computer Networks
Number of hours per week: 04
Total Classes : 44

Lecture Plan

Class	Topic	BTL	Target CO
1	Introductory Concepts: Goals and Applications of Computer Networks	BTL1	CO1
2	OSI reference model, TCP/IP protocol suite	BTL1	CO1
3	Networks topology & design. Networking Devices (Hub, Bridge, Switch & router)	BTL3	CO2
4	Physical Layer: The functions of Physical Layer	BTL3	CO1, CO2
5	Guided Transmission Media, Wireless Transmission media	BTL3	CO1, CO2
6	Communication Satellites	BTL3	CO2
7	Digital Signal Encoding Formats	BTL3	CO1, CO2
8	Digital to Analog Modulation	BTL3	CO1, CO2
9	Digitization – Sampling Theorem, PCM, DM	BTL3	CO1, CO2
10	Analog to digital Modulation	BTL3	CO2
11	The Mobile Telephone System, Multiplexing	BTL3	CO2
12	The Data Link Layer: Data Link Layer introduction	BTL4	CO4
13	Error Detection and Correction	BTL4	CO4
14	Flow Control Protocols	BTL4	CO4
15	Error Control protocols.	BTL4	CO4
16	Medium access sublayer: Channel allocation problem	BTL4	CO4
17	ALOHA Protocols	BTL4	CO4
18	Carrier Sense Multiple Access Protocols	BTL4	CO4
19	CSMA with Collision Detection	BTL4	CO4
20	Collision free protocols	BTL4	CO4
21	Ethernet, wireless LANs	BTL4	CO2, CO4
22	Bluetooth, Wi-Fi	BTL4	CO2, CO4
23	Network Layer	BTL3	CO3
24	Functions of network layer	BTL3	CO3
25	IPv4: Classful Addressing	BTL3	CO3
26	Classless addressing	BTL3	CO3
27	Routing algorithms	BTL5	CO5

28	Static & Dynamic routing	BTL5	CO5
29	IP packet format	BTL5	CO5
30	IPv6: addressing	BTL5	CO5
31	Mobile IP	BTL5	CO5
32	Mobility in networks	BTL5	CO5
33	IP Multicasting (Source based tree & Group shared tree)	BTL5	CO5
34	Transport Layer: Transport layer functions	BTL6	CO6
35	Transport layer protocols, UDP	BTL6	CO6
36	TCP, connection management	BTL6	CO6
37	flow control, error control	BTL6	CO6
38	Congestion control.	BTL6	CO6
39	Application Layer: DNS	BTL6	CO6
40	Electronic Mail, www	BTL6	CO6
41	Firewalls	BTL6	CO6
42	Concept of public & private keys	BTL6	CO6
43	DOUBT CLEARING SESSION		
44	MOCK TEST		

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Paper Code- MCA-223	Course: MCA	Subject: Cloud Computing

Lesson Plan

Unit No.	Topic	Text Book	Reference Book	Objective	Target CO & BT level (Specify CO no)	Outcome
1	Introduction to Cloud Computing: Definition, Evolution & Characteristics, Service Models of cloud computing IaaS, PaaS, SaaS and their Comparisons, Issues & Challenges of Cloud Computing, Applications of Cloud computing	TB1 (Ch-1)	RB1	Cloud Computing Basic concepts and its applications, Popular public clouds and their features.	CO1, BTL3, CO3, BTL4	Identify the importance of Cloud Computing Paradigm, Cloud Security primitives & Load Configurations
1	Overview of Cloud Computing Security Configurations. Cloud Computing Architecture: Introduction, Cloud Architecture, Deployment of Models – (Public, Private, Community, and Hybrid Clouds) and their comparisons, IDaaS, Over View of Data intensive computing through Map Reduce	TB1 (Ch-2)	RB1	Cloud Computing Basic concepts and its applications, Popular public clouds and their features. Security issues in cloud and available countermeasures.	CO1, CO2, BTL3, CO3, BTL4	Understand the Cloud Security primitives, Examine the Use cases of various Cloud Computing Titans.
2	Virtualization in Cloud: Virtualization, Implementation of Virtualization,	TB1 (Ch-3)	RB1	Virtualization and its role in the implementati	CO2, BTL4	Model and apply the concepts of

	Middleware Support for Virtualization, Advantages & Applications of Virtualization, Virtualization Implementation Techniques, Hardware Virtualization, Types of Virtualization			on of cloud computing		Virtualization and Security in the cloud computing environment
2	Security Issues in Cloud Computing: Introduction, Security Challenges in Cloud Computing, Information Security, Privacy and Trust in Cloud Computing	TB1 (Ch-4)		Security issues in cloud and available countermeasures. Virtualization and its role in the implementation of cloud computing	CO2, BTL3, CO3, BTL4	Understand the Cloud Security primitives
3	Data Centre Architecture and Technologies: Architectural Building Blocks of Data Centre, Industry Direction and Operational and Technical Phasing, Industry Direction and Overview of Operational and Technical Phasing (Overview of 5 Phases)	TB2 (Ch-3)		Data centre overview and its architecture. Popular public clouds and their features.	CO1, BTL3, CO3, BTL4	Analyze the concept of Data Centres with Cloud Computing and examine the Use cases of various Cloud Computing Titans
3	Computing with Titans: Google, Microsoft, Amazon, IBM, Accessing the Cloud- Platforms through a brief overview of Web Applications, Web API's, Web Browsers.	TB3 (Ch-6)		Popular public clouds and their features.	CO3, BTL4, CO4, BTL6	Examine the Use cases of various Cloud Computing Titans

4	Migrating to the Cloud: Cloud Services for Individuals, Cloud Services aimed at Mid Markets, Enterprise, Best Practices and Future of Cloud Computing. Implementation of Cloud Using Any Cloud Platform :	TB3 (Ch-13,14)	RB2	Popular public clouds and their features. Virtualization and its role in the implementation of cloud computing	CO3, BTL4, CO4, BTL6	Design & Appraise Cloud Computing based VMS and weigh the advantages & disadvantages of various proprietary platforms along with available best practices.
5	Introduction to Web Services, Structure, Objective, Cloud Portals, Groups, Mobile Apps, Setting up of Cloud Services, Containers, Handling Cloud Shell, Setting up of projects, Building Virtual Infrastructure, Deployment of Virtual Machine, Configuring Load Balancing.	TB4 (Ch-6)	RB2	Virtualization and its role in the implementation of cloud computing, Cloud Computing Basic concepts and its applications Popular public clouds and their features.	CO1, CO2, BTL3, CO4, BTL6	Design & Appraise Cloud Computing based VMS and weigh the advantages & disadvantages of various proprietary platforms along with available best practices

TEXT BOOKS:

TB1. V. K. Pachghare, "Cloud Computing" PHI Learning, 1st Edition, 2016.

TB2. Venkata Josyula, Malcom Orr, Greg Page, "Cloud Computing – Automating the Virtualized Data Center", Cisco Press, 1st Edition, 2016.

TB3. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing a Practical Approach", McGraw Hill, 1st Edition, 2015.

TB4. Mitanshi Joshi, "Agile, DevOps and Cloud Computing with Microsoft Azure", BPB Publications, 1st Edition, 2019

REFERENCE BOOKS:

RB1. Erl Thomas, Puttini Ricardo, Mahmood Zaigham, "Cloud Computing - Concepts, Technology and Architecture", Pearson India, 1st Edition, 2014.

RB2. Srinivas Cheemalapti Yi-an Chang, Shahir Daya, Matthieu Debeaux, Odilon Magroski Goulart, Vasfi Gucer, Rahul Gupta, Shamim Hossain, David Kwock, Jordan T Moore, David N Nguyen, Bobby Woolf, "Hybrid Cloud Data and API Integration: Integrate Your Enterprise and Cloud with Bluemix Integration Services", IBM Redbooks, 2nd Edition, 2016.

RB3. Has Altaiar Jack Lee, Michael Peña, "Cloud Analytics with Microsoft Azure: Build modern data warehouses with the combined power of analytics and Azure", Packt Publishing Ltd, 1st Edition, 2019.

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Paper Code- MCA-223	Course: MCA	Subject: Cloud Computing

Lecture Plan

Lecture No.	Topic	Mapping
1	UNIT I: Introduction to Cloud Computing: Definition, Evolution & Characteristics,	CO1, BTL3 CO3, BTL4
2	Service Models of cloud computing IaaS, PaaS, SaaS	
3	IaaS , PaaS, SaaS Comparisons	
4	Issues & Challenges of Cloud Computing	CO4,BTL6
5	Applications of Cloud computing	
6	Overview of Cloud Computing Security Configurations	
7	Cloud Computing Architecture: Introduction, Cloud Architecture,	CO2, BTL3, CO3, BTL4
8	Deployment of Models – (Public, Private, Community, and Hybrid Clouds)	
9	Public, Private, Community, and Hybrid Clouds comparisons	
10	IDaaS	CO1, BTL3
11	Over View of Data intensive computing through Map Reduce	CO3, BTL4
12	Class Test 1	
13	UNIT II : Virtualization in Cloud: Virtualization, Implementation of Virtualization,	CO2, BTL3, CO3, BTL4
14	Middleware Support for Virtualization	
15	Advantages & Applications of Virtualization	
16	Virtualization Implementation Techniques,	CO2, BTL3, CO3, BTL4
17	Hardware Virtualization	
18	Types of Virtualization.	
19	Security Issues in Cloud Computing: Introduction	CO4,BTL6
20	Security Challenges in Cloud Computing,	
21	Information Security,	
22	Privacy and Trust in Cloud Computing	
23	UNIT III: Data Centre Architecture and Technologies: Architectural Building Blocks of Data Centre	CO1,CO2, BTL3, CO3, BTL4
24	Industry Direction and Operational and Technical Phasing,	
25	Industry Direction and Overview of Operational and Technical Phasing (Overview of 5 Phases)	
26	Class Test II	
27	Computing with Titans: Google, Microsoft, Amazon, IBM	CO3, BTL4

28	Accessing the Cloud- Platforms through a brief overview of Web Applications,	CO1, BTL3, CO4, BTL6
29	Web API's	
30	Web Browsers.	
31	Revision	
32	UNIT IV: Migrating to the Cloud: Cloud Services for Individuals,	CO1,BTL3,CO3, BTL4, CO4, BTL6
33	Cloud Services aimed at Mid- Markets, Enterprise,	
34	Best Practices and Future of Cloud Computing	
35	Implementation of Cloud Using Any Cloud Platform : Introduction to Web Services,	
36	Best Practices and Future of Cloud Computing.	
37	Implementation of Cloud Using Any Cloud Platform : Introduction to Web Service	
38	Structure, Objective, Cloud Portals, Groups	CO3, BTL4
39	Mobile Apps, Setting up of Cloud Services,	CO1, BTL3, CO3, BTL4,CO4, BTL6
40	Containers	
41	Handling Cloud Shell	
42	Setting up of projects, Building Virtual Infrastructure	
43	Deployment of Virtual Machine, Configuring Load Balancing	CO1, BTL3
44	Revision	

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BCA Semester II: Subject: Data Structures & Algorithms using C

Paper Code No.: BCA 106 **Paper Name: Data Structures using C 44 L & T**

LESSON PLAN

Unit	Topic	COs	No. of Hrs
1	UNIT – I Chapter / Book Reference: TB1 [Chapters 1, 4, 9], TB2 [Chapters 1, 6, 7], TB3 [Chapters 1, 2,6,10] Linear Data Structures- Static: Introduction to Algorithms- Attributes, Design Techniques, Time Space Trade Off, Data Structures, Classification and Operations of Data Structures. Arrays: Single Dimension, Two-Dimension and Introduction to Multi Dimensions, Memory Representation, Address Calculation, Sparse Matrices- Types, Representation. Searching and Sorting: Linear and Binary Search, Selection Sort, Bubble Sort, Insertion Sort, Merge Sort, Elementary Comparison of Searching and Sorting Algorithms. Hashing: Hash Table, Hash Functions, and Collision Resolution.	CO1	14
2	UNIT – II Chapter / Book Reference: TB1 [Chapter 5], TB2 [Chapter 4], TB3 [Chapter 3] Linear Data Structures- Dynamic Introduction: Dynamic Memory Allocation, Dynamic Memory versus Static Memory Allocation. Linked List Types: Singly Linked List, Doubly Linked List, Header Linked List, Circular Linked List. Operations: Creation, Insertion, Deletion, Modification, Searching, Sorting, Reversing, and Merging.	CO2	10
3	UNIT – III Chapter / Book Reference: TB1 [Chapter 6], TB2 [Chapters 2, 4], TB3 [Chapters 4, 5] Abstract Data Types: Stacks: Introduction, Static and Dynamic Implementation, Operations, Applications- Evaluation and Conversion between Polish and Reverse Polish Notations. Queues: Introduction, Static and Dynamic Implementation, Operations, Types- Linear Queue, Circular Queue, Doubly Ended Queue, Priority Queue.	CO3	9
4	UNIT – IV Chapter / Book Reference: TB1 [Chapters 7, 8], TB2 [Chapters 5, 8], TB3 [Chapters 7, 8] Non-Linear Data Structures: Introduction to Graphs: Notations & Terminologies, Representation of Graphs- Adjacency Matrix, Incidence Matrix and Linked Representation.	Co4	11

	Trees: Notations & Terminologies, Memory Representation, Binary Trees Types- Complete, Full, Strict, Expression Binary Tree, Tree Traversals (Recursive), Binary Search Tree and Basic Operations Introduction and Creation (Excluding Implementation): AVL Tree, Heap Tree, M- Way Tree, and B Tree.		

TEXT BOOKS:

1. TB1. Schaum's Outline Series, "Data Structures", TMH, Special Indian Ed., Seventeenth Reprint, 2014.
2. TB2. Y. Langsam, M. J. Augenstein and A.M. Tanenebaum, "Data Structures using C and C++", Pearson Education India, Second Edition, 2015.
3. TB3. D. Samanta, "Classic Data Structures", PHI, Second Edition, 2009.

REFERENCE BOOKS:

4. RB1. Ashok N kamthane "Introduction to Data Structures in C", Pearson, Third Edition, 2009.
5. RB2. E. Horowitz and S. Sahni, "Fundamentals of Data Structures in C". Universities Press, Second edition, 2008.
6. RB3. D. Malhotra and N. Malhotra, "Data Structures and Program Design using C", Laxmi Publications, Indian adapted edition from Mercury Learning and Information-USA, First edition, 2018.
7. RB4. Y. Kanetkar "Data Structures through C", BPB Publication, Third Edition, 2019.
8. RB5. R.F Gilberg, and B A Frouzan- "Data Structures: A Pseudocode Approach with C", Thomson Learning, Second Edition, 2004. RB6. A. K. Rath, and A.K. Jagadev, "Data Structures and Program Design Using C", Scitech Publications, Second Edition, 2011

Suggested Book:

1. Data Structures using C by Reeraja Thareja, 2nd Edition-2014; Oxford Publisher
2. Data Structures and Algorithm made easy by Narsimha Karumanchi, 5th Edition - 2016: Career monk Publication

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BCA Sem II: Subject: Data Structures using C

Detailed Lesson Plan

Class No.	Unit	Topic
		Assignment 1 to be announced
1	Unit I	Introduction to Data Structures, Importance of DS, Algorithm Writing,
2		Data Structures, Classification and Operations of Data Structures.
3		Introduction to Algorithms- Attributes, Design Techniques, Time Space Trade Off
4		Arrays: Single Dimension
5		Two-Dimension and Introduction to Multi Dimensions
6		Memory Representation, Address Calculation
27		Sparse Matrices- Types, Representation.
8		Linear and Binary Search
9		Sorting: Selection Sort, Bubble Sort
10		Insertion Sort, Merge Sort
11		Elementary Comparison of Searching and Sorting Algorithms
12		Hashing: Hash Table.
13		Hash Functions and Collision Resolution
14		Class Test and Assignment Submission
		Tutorial 1
		Tutorial 2
		Class Test and Group Project 1 will be announced
		Assignment 2 to be announced
15		Dynamic memory allocation
16		Comparison of Static and Dynamic memory
17	Unit II	Introduction to linked lists
18		Creation of Linked List
19		Basic operations on Linked List-Traversal
20		Basic operations on Linked List-Insertion and Deletion
21		Basic operations on Linked List- reversing and merging of lists
22		Two way lists
23		Revisiting Two way List
24		Use of headers and circular list
		Tutorial 3
		Tutorial 4
		Class Test and Group Project 2 will be announced
		Assignment 3 to be announced
25	UNIT III	Stack concept and theory, Stack on array
26		Primitive operations on Stack and multi stack
27		Stack using Linked List
28		Polish Notations; Evaluation of postfix expression
29		Conversion from infix to postfix
30		Queue - Introduction and primitive operations on queues;

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31		Queue using a Linked List
32		D-queues
33		Circular Queue
34		Priority queues
35		Class Test/ Assignment Submission
		Tutorial 5
		Tutorial 6
		Assignment 4 to be announced
36	Unit IV	Graph Concept
37		Graph representation- Matrix representation
38		Graph representation using linked list
39		Introduction to Trees: Tree Terminology
40		Binary Tree and Binary Search Tree
41		BST basic operations: creation of BST insertion deletion
42		BST basic operations: Recursive Traversal of tree
43		BST basic operations: insertion and deletion
44		AVL Tree
45		Heap Tree
46		m-way tree and B-tree
		Class Test and Group Project 2 allocation
		Revision / Tutorial
		Revision / Tutorial

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LESSON PLAN

Subject Name – Management Accounting Subject Code: BBA 207

Objective:

The objective of the course is to familiarize the learners with the basic management accounting concepts and their applications in managerial decision making.

Course Outcomes:

1. Understand the nature and scope of Management Accounting.
2. Analyse and interpret the accounting financial statements of a company and its limitations.
3. Executing skills to prepare various Budgets.
4. Examining the impact of different ratios on the financial performance of a company.
5. Compute cash flow analysis and its likely impact on the company

Pedagogy:

A cautious blend of lectures, class discussions, assignments, class tests and classroom activity.

Lecture Plan:

UNIT	TOPICS	No. of Lectures	Exercises	CO Mapping
I	**Introduction:** Meaning, Objectives, and Scope of management accounting; Difference between financial accounting, cost accounting and management accounting; Comparative financial statements, common size financial statements, trend analysis, Ratio analysis, cash flow statement.	10	Assignment I, Problem solving activity	CO 1, CO 2, CO 5
	Budgetary Control and Variances. Concept and types of budgeting and budgetary control; meaning,			

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II	objectives, merits, and limitations of budgetary control; budget administration; Functional budgets including cash budget; Fixed and flexible budgets: meaning and preparation; Zero-based budgeting; Performance budgeting, difference between performance & traditional budgeting. Meaning of Variance and Variance Analysis – Material, Labour, Overheads and Sales Variances, Disposition of Variances, Control Ratios.	14	Class test I, Presentation	CO 3
III	**Costing and Profit Planning:** Meaning of Variable Costing, Absorption Costing and Marginal Costing; uses of Marginal costing; Cost-Volume-Profit Analysis, Profit/Volume ratio, Break-Even Analysis - Algebraic And Graphic Methods, Angle of Incidence and Margin of Safety.	10	Assignment II, Problem solving activity	CO 4
IV	**Managerial Decision Making:** Decision making based on Marginal Cost Analysis - profitable product mix, Make or Buy, Addition or Elimination of a product line, sell or process further, operate or shut down Managerial Decision-making using spreadsheets.	10	Class test II, Problem solving activity	CO 5

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Lecture Plan

Program: BBA
Subject: BBA-216: Financial Markets and Institutions Code: 216

Objectives
The course aims to familiarize the learners with and overview of Financial Markets and Institutions in India.

Pedagogy
A judicious mix of lectures, practical applications, group activities

CO1: Analyze the functioning of financial markets and Institutions in India
CO2: Examine the functioning of money market and capital market
CO3: Assess the impact of initiatives on financial inclusion.
CO4: Understand the role and functions of financial institutions

Lecture Plan

UNIT	TOPICS	LECTURES	CO MAPPING	LEARNING OUTCOMES
I	**Introduction to Financial System** Components of financial system, Financial System and economic development, Financial Intermediaries, Overview of Indian Financial System, Financial Sector Reforms	8	CO1	Analyze the functioning of financial markets and Institutions in India
II	**Money Market** Money Market: Concept and role, Functions and Importance, Money Market Instruments, Reserve Bank of India: Structure and role, Money market operations, Monetary Policy Committee (MPC) – Structure, Role, Policy rates, Impact of monetary policy on inflation and liquidity,	14	CO2	Examine the functioning of money market and capital market
III	**Capital Markets** Capital Markets – Concept, role, Functions and importance, Components of capital market, Cash markets – Equity, Debt, Depository, Primary and Secondary Markets, Derivatives and Commodity markets, Role of Stock Exchanges in India, Securities and Exchange Board of	14	CO2	Examine the functioning of money market and capital market

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	India (SEBI), Role in Capital Market development and Investor Protection and Awareness			
IV	**Banking and other Financial Institutions** Commercial Banks: Classification, Payment Banks, Small banks, Cooperative banks, Recent Initiatives like MUDRA financing scheme, Financial Inclusion, Non-Performing Assets (NPA)- Meaning, causes and impact on banking sector, Insolvency and Bankruptcy Code, 2016, Role and Importance of Non-Banking Financial Companies (NBFCs), Development Financial Institutions (DFIs), Housing Finance Institutions – National Housing Bank, HUDCO, Micro Finance and Rural Credit –NABARD, Post Office Banks	12	CO3, CO4	Assess the impact of initiatives on financial inclusion. Understand the role and functions of financial institutions

Total Lectures proposed for upcoming session: 48 lectures

Suggested Readings: (All latest editions)

1. Gordon. E. & Natarajan, K., Financial Markets and Services, Himalaya Publishing House
2. Kumar, V., Gupta, K., & Kaur, M., Financial Markets, Institutions and Financial Services, Taxmann's Publications
3. Khan M. Y., & Jain, P.K., Financial Services, McGraw Hill Publishing Company
4. Khan, M. Y., Indian Financial System – Theory and Practice, Vikas Publishing House
5. Pathak, Bharati, Indian Financial System, Pearson Education
6. Annual Reports: Reserve Bank of India, Ministry of Finance, Government of India

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Lesson Plan

BA ECO (hons) Guru Gobind Singh Indraprastha University			
Paper	**Paper Code**	**Paper Title**	**Credit**
Core	BA ECO (hons) – 309 (V - Semester)	Applied Econometrics	05
Number of Lecture Hours / Week		04	
Total Number of Lecture Hours		48	
Exam Hours		3 Hours	
Exam Marks		100 (End Term Exam – 75, Internal Assessment – 25)	

Teaching Pedagogy and Delivery Mechanism:

- **Hands-on Learning with Software**: Use R-Studio to work on real-world data, helping students see how econometrics applies to actual problems.
- **Flipped Classroom**: Share videos or readings before class so students can spend class time solving problems and discussing ideas.
- **Simulations and Visuals**: Show data visualizations and run simulations to make complex ideas easier to understand.

Recommended Readings:

- Wooldridge, J. M. (2022). Introductory econometrics: A modern approach (7th ed.). Cengage Learning.
- Stock, J. H., & Watson, M. W. (2020). Introduction to econometrics (4th ed.). Pearson.
- Gujarati, D. N., & Porter, D. C. (2022). Essentials of econometrics (6th ed.). McGraw Hill.
- Dougherty, C. (2021). Introduction to econometrics (5th ed.). Oxford University Press.

Teaching Outline

UNITS	CONTENTS	SESSIONS
UNIT-1 K variable regression CO-1	• Introduction • OLS Parameter Estimation • Properties • Parameter Estimation • Partial Regression Coefficients • Hypothesis Testing – Individual and Joint • Practice questions	1 – 7
UNIT-2 Diagnostic Check	• Heteroscedastic • Autocorrelation • Multicollinearity	8 – 24

	• Test	
UNIT 3 – Panel Data	• Introduction to Panel Data • Within and Between Estimators • LSDV Model • Random Effect • Fixed effect • Hausman Test	25 – 34
UNIT-4 Time series Analysis	• Introduction • Stationary Data • Problem od Unit Root • Dickey Fuller Test • AR models	35-44
R-studio Lab	**LAB SESSIONS**	45-48

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LECTURE PLAN

Paper	Paper Code	SEM	Paper Title	Credit
Elective	BA ECO (hons) – 309	V	Applied Econometrics	05

Objective:

To provide students with essential econometric skills and knowledge that are directly applicable to their research endeavours, enhancing their ability to conduct meaningful and impactful studies.

Lecture no	UNIT-1 (K-Variable regression) – CO1	Pedagogy used
1	○ Introduction ***(BTL 1: Remembering)***	• **Classroom Lectures**: Explanation of fundamental concepts like CLRM assumptions, partial regression coefficients. • **Interactive Problem-Solving**: Use real-world data for hypothesis testing. • **Hands-on Software Practice**: In-class exercises using R-Studio for regression analysis to reinforce concepts. • **Conducted quiz** to reinforce key concepts (copy attached)
2	○ CLRM Assumptions ***(BTL 2: Understanding)***	
3	○ Partial Regression Coefficient ***(BTL 3: Applying)***	
4		
5	○ Multiple Linear Regression (***BTL 4: Analysing)***	
6		
7	○ Practice Questions ***(BTL 3: Applying)***	
	○ Practice Questions ***(BTL 3: Applying)***	
	UNIT 2: Regression Diagnostics - CO 2	
	AUTOCORRELATION	• **Problem-Based Learning**: Use case studies and real data to explain the causes, consequences, and detection methods for autocorrelation, multicollinearity, and heteroskedasticity. • **Class Discussions**: Interactive Q&A sessions to help students understand regression diagnostics concepts. • **Lab Exercises**: Detection and remedial measures can be taught
8	Meaning and Causes –***(BTL 2: Understanding)***	
9	Consequences –***(BTL 2: Understanding)***	
10	Method of Detection- ***(BTL 3: Applying)***	
11	Method of Detection - ***(BTL 3: Applying)***	
12	Remedial Measures - ***(BTL 3: Applying)***	
	MULTICOLLINEARITY	
13		

14	Introduction and Causes– ***(BTL 2: Understanding)***	using R programming in lab sessions.
15	Consequences– ***(BTL 2: Understanding)***	
16	Method of Detection- ***(BTL 3: Applying)***	
17	Method of Detection- ***(BTL 3: Applying)***	
18	Test- ***(BTL 3: Applying)***	
	Remedial Measures- ***(BTL 3: Applying)***	
19	**MULTICOLLINEARITY**	
20	Meaning and Causes–***(BTL 2: Understanding)***	
21	Consequences–***(BTL 2: Understanding)***	
22	Method of Detection- ***(BTL 3: Applying)***	
23	Method of Detection- ***(BTL 3: Applying)***	
24	Remedial Measures- ***(BTL 3: Applying)***	
	Practice Question- ***(BTL 3: Applying)***	
	UNIT-3 (Panel Data)	
25	Introduction &Features–***(BTL 2: Understanding)***	• **Interactive Lectures**: Use slides and real examples to introduce panel data and explain models like Pooled OLS, LSDV. • **Group Work**: Encourage students to work in teams to analyse panel data using R-Studio. • **Quizzes and Tests**: Regular tests and quizzes to check understanding of panel data concepts like the Hausman test.
26	Pooled OLS model- ***(BTL 3: Applying)***	
27	Pooled OLS model- ***(BTL 3: Applying)***	
28	Within and Between Estimators- ***(BTL 3: Applying)***	
29	LSDV model- ***(BTL 4: Analysing)***	
30	LSDV Model- ***(BTL 4: Analysing)***	
31	Fixed Effect model***(BTL 4: Analysing)***	
32	Random Effect- ***(BTL 4: Analysing)***	
33	Hausman Test- ***(BTL 4: Analysing)***	
34	Test- ***(BTL 3: Applying)***	
	UNIT-4 (Time Series)	

35	Introduction–***(BTL 2: Understanding)***	• **Simulation and Data Visualization**: Use time-series plots to show stationarity and unit root problems. • **Lab-Based Learning**: Perform ADF tests and build ARMA models using R in lab sessions. • **Research Papers**: Apply time-series analysis on financial or economic data, helping students to link theory with real-world applications.
36	Univariate model–***(BTL 2: Understanding)***	
37	Concept of Stationarity–***(BTL 2: Understanding)***	
38	Problem of Unit Root***(BTL 3: Applying)***	
39	Augmented Dickey Fuller Test***(BTL 3: Applying)***	
40	Augmented Dickey Fuller Test***(BTL 3: Applying)***	
41	Auto-Regressive Model***(BTL4: Analysing)***	
42	Application AR Model***(BTL4: Analysing)***	
43	MA model***(BTL4: Analysing)***	
44	ARMA model***(BTL4: Analysing)***	
45-48	**R-Programming lab *(BTL 3: Applying, BTL4: Analysing)***	• **Hands-On Learning**: Conduct R-Studio lab sessions for data analysis, model building, and testing. • **Guided Practice**: Provide datasets and step-by-step guidance for performing econometric analysis using R.