



University of Engineering and Management
Institute of Engineering & Management, Salt Lake Campus
Institute of Engineering & Management, New Town Campus
University of Engineering & Management, Jaipur



6th Semester Syllabus for Business Analytics
For BBA Admission Batch 2022

Syllabus Structure:

COURSE 3rd Year Course Structure: 2025 – Even Semester

BBA BA COURSE Structure SEMESTER 6									
SL NO	TYPES OF COURSE	SUB CODE	SUB NAME	L	T	P	S	TOTAL CONTACT HRS	CREDI T POINT S
THEORY									
1.	CC	BBABB601	Supply Chain and Logistics Management	3	1	0	0	4	4
2.	AEC	BBA(GS)601	General Studies & Current Affair - VI	2	0	0	0	2	2
PRACTICAL									
1	VAC	BBABB691	Supply Chain and Logistics Management - Laboratory	0	0	2	0	2	2
2	VAC	BBABB681	Project And Viva Voice	5	1	0	0	6	6
BUSINESS ANALYTICS SPECIALIZATION									
THEORY									
1.	CC	BBABA602	Advanced Data Analytics	3	1	0	0	4	4
2.	CC	BBABA603	Econometrics	3	1	0	0	4	4
3.	CC	BBABA604	Data Mining	3	1	0	0	4	4
PRACTICAL									
1	VAC	BBABA692	Advanced Data Analytics - Laboratory	0	0	2	0	2	2
2	VAC	BBABA693	Econometrics - Laboratory	0	0	2	0	2	2
3	VAC	BBABA694	Data Mining - Laboratory	0	0	2	0	2	2
SESSIONAL									

1	SEC	BBA(GS)681	Competitive Aptitude & Training -VI	1	0	0	1	1
MOOCS/MAR/IFC								
1		IFC	Industry & Foreign Certification					
2		MAR	Mandatory Additional Requirements					
3		MOOCs	At least 1 MOOCs course from Swayam Platform					



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Syllabus for BBA Admission Batch 2022



Subject Name: Supply Chain and Logistics Management

Credit: 4

Lecture Hours: 40

Subject Code: BBABB601

Pre-requisite: NA

Relevant Links:

[Study Material](#)

[Coursera](#)

[NPTEL](#)

[LinkedIn Learning](#)

[Infosys](#)

[Springboard](#)

COURSE OBJECTIVES:

1. To understand the key concepts applied in supply chain & logistics management.
2. To understand how supply chain & logistics management plays an important role in the business.
3. To Identify and analyze supply chain & logistics problems & design optimal solutions.
4. To understand new trends in supply chain & logistics management.

COURSE OUTCOMES:

- CO1:** Understand the nature of SC and explain the impact of supply chain decisions on the success of the firm.
- CO2:** Examine the role of each driver on the performance of SC
- CO3:** Evaluate the strengths and weaknesses of different modes of transportation, understand the role of warehousing and packaging and also evaluate the warehousing strategies
- CO4:** Appraise the various latest trends in SC and Logistics Management

Module number	Topic	Sub-topics	Text Book	Mapping with Industry and International Academia	Lecture Hours	Corresponding Lab Assignment
1	Introduction to Supply Chain Management	<ul style="list-style-type: none"> Introduction to SC, Evolution of SC, Flows in SC, SC stages, Objectives of SC, SC Decision Phases, Decisions in SC, Process View of SC, Cycle view and Push-Pull view, Extended SC, SC Integration, Performance Metrics, Challenges in SC 	<p>Text Book 1: Supply chain management – Strategy, Planning and Operation by Sunil Chopra, D. V. Kalra, Pearson, 7th Edition, 2019 Chapter: 1</p>	<p>International Academia: https://ocw.mit.edu/courses/eis-273j-logistics-and-supply-chain-management-fall-2009/</p> <p>Industry Mapping: Problem-Solving and Decision-Making</p>	10	<ul style="list-style-type: none"> Video Discussion on Introduction to SC <p>Case Study:</p> <ul style="list-style-type: none"> Zara: Apparel Manufacturing & Retail Toyota: A Global Auto Manufacturer Amazon: Online Sales Jaipur Rugs Company: A Socioeconomic Network <p>Source: Supply chain management – Strategy, Planning and Operation by Sunil Chopra, D. V. Kalra, Pearson, 7th Edition, 2019 Chapter: 1 (Pg. No. – 16-21)</p>
2	Supply Chain Framework & Drivers	<ul style="list-style-type: none"> Impellers of SC, Drivers of SC Performance, Framework for structuring drivers SC Drivers: Facilities, Inventory, Transportation, Information, Sourcing, Pricing. 	<p>Text Book 1: Supply chain management – Strategy, Planning and Operation by Sunil Chopra, D. V. Kalra, Pearson, 7th Edition, 2019 Chapter: 3</p>	<p>International Academia: https://ocw.mit.edu/courses/15-763j-manufacturing-system-and-supply-chain-design-spring-2005/</p> <p>Industry Mapping: Supply Chain Planning, Adaptability and Flexibility</p>	10	<p>Case Study</p> <ul style="list-style-type: none"> 7 Eleven Japan Co. <p>Source: Supply chain management – Strategy, Planning and Operation by Sunil Chopra, D. V. Kalra, Pearson, 7th Edition, 2019 Chapter: 3</p>

						(Pg. No. – 77-83)
3	Introduction to Logistics management & Logistics Mix	<ul style="list-style-type: none"> • Introduction to Logistics management & Logistics Mix • Transportation: Role of Transportation, Selection criteria, Modes of Transportation, Intermodal Transportation, Transportation Network, Freight Management, Containerization, • Warehousing: Objectives, Functions, Warehouse options, Warehouse Site selection, Layout Design, Warehouse Strategies • Material Handling and Storage • Packaging: Consumer and Logistical packaging, Unitization, Packaging Material, Returnable Logistical Packaging, Packaging Cost 	<p>Text Book 1: Logistics Management by V. V. Sople, Pearson, 3rd Edition, 2012</p> <p>Chapter -1, 4, 5, 6, 8, 9</p>	<p>International Academia: https://ocw.mit.edu/courses/esd-260j-logistics-systems-fall-2006/</p> <p>Industry Mapping: Planning, Negotiation Skills</p>	10	<p>Video Discussion on Containerization, Warehousing, Material Handling (Source: Youtube)</p> <p>Case Study:</p> <ul style="list-style-type: none"> • Cadbury Products • ROX Doc Care • Suman Crop Protection <p>Source: Logistics Management by V. V. Sople, Pearson, 3rd Edition, 2012 (Pg. No. – 424, 434, 444)</p>
4	Recent Trends in Supply chain & Logistics Manage	<ul style="list-style-type: none"> • Sustainability in SC • Green Supply Chain Management. • Reverse Supply Chain • Vendor managed inventory • Bar-coding & RFID. 	<p>Text Book 1: Supply chain management – Strategy, Planning and Operation by Sunil Chopra, D.</p>	<p>International Academia: https://ocw.mit.edu/courses/esd-s43-green-supply-chain-management-spring-2014/</p> <p>Industry Mapping:</p>		

	ment	<ul style="list-style-type: none"> • Role of IT in the Supply Chain. E-Business and the Supply Chain • Cold Chain Logistics • AI in Supply Chain 	<p>V. Kalra, Pearson, 7th Edition, 2019</p> <p>Chapter: A</p> <p>Text Book 2: Logistics Management by V. V. Sople, Pearson, 3rd Edition, 2012</p> <p>Chapter – 15, 23</p> <p>Text Book 3: Supply Chain Management by V. V. Sople, Pearson, 1st Edition, 2012</p> <p>Chapter- 18, 22, 27</p>	Supply Chain Planning, Adaptability and Flexibility	10	<p>Video Discussion on Green SCM, Implementation of RFID Source: Youtube</p> <p>Case Study:</p> <ul style="list-style-type: none"> • Indian Paints • Zara <p>Source: Supply Chain Management by V. V. Sople, Pearson, 1st Edition, 2012 (Pg. No. 464, 475)</p>
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Prepared By: Prof. (Dr.) Shweta Kishore & Prof. Tanmoy Chakraborty

TEXT BOOK:

1. Supply chain management – Strategy, Planning and Operation by Sunil Chopra, D. V. Kalra, Pearson, 7th Edition, 2016 (Chapter 1, 3, A)
2. **Logistics Management by V. V. Sople, Pearson, 3rd Edition, 2012**
(Chapter - 1, 4, 5, 6, 8, 9, 15, 23)
3. Supply Chain Management by V. V. Sople, Pearson, 1st Edition, 2012 (Chapter- 18, 22, 27)

REFERENCE BOOKS:

1. Supply Chain Management – Process, System and Practice by N. Chandrasekaran, Oxford University Press, 2013
2. Supply Chain Management- Text and Cases, Jannat Shah, 2nd Edition, Pearson



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Syllabus for BBA Admission Batch 2022

Subject Name: Supply Chain and Logistics Management – Laboratory Credit: 2 Lecture Hours: 20

Subject Code: BBABB691

Pre-requisite: NA

Module number	Topic	Sub-topics	TextBook	Mapping with Industry and International Academia	Lecture Hours
1	Analyzing the Supply Chain Practices and its impact on performance	<ul style="list-style-type: none">• Walmart• 7 Eleven Japan• Dmart• Reliance• Subhiksha	Text Book 1: Supply chain management – Strategy, Planning and Operation by Sunil Chopra, D. V. Kalra, Pearson, 7 th Edition, 2019 Chapter: 1	International Academia: https://ocw.mit.edu/courses/esd-273j-logistics-and-supply-chain-management-fall-2009/ Industry Mapping: Problem-Solving and Decision-Making	10 Hours

2	Logistics Network Design	<ul style="list-style-type: none"> • Logistics network design with differentiated delivery lead time • Logistics network design with price discount • Consolidated logistics network design using consolidation hubs. • Strategic decisions: In terms of warehouses when plants and retailer locations are Fixed 	Text Book 1: Logistics Management by V. V. Sople, Pearson, 3 rd Edition, 2012 Chapter -1, 4, 5, 6, 8, 9	International Academia: https://ocw.mit.edu/courses/esd-260j-logistics-systems-fall-2006/ Industry Mapping: Planning, Negotiation Skills	10 Hours
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Prepared By: Prof. (Dr.) Shweta Kishore & Prof. Tanmoy Chakraborty

TEXT BOOK:

1. Supply chain management – Strategy, Planning and Operation by Sunil Chopra, D. V. Kalra, Pearson, 7th Edition, 2016 (Chapter 1, 3, A)
2. **Logistics Management by V. V. Sople, Pearson, 3rd Edition, 2012** (Chapter - 1, 4, 5, 6, 8, 9, 15, 23)
3. Supply Chain Management by V. V. Sople, Pearson, 1st Edition, 2012 (Chapter- 18, 22, 27)

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2. Supply Chain Management- Text and Cases, Jannat Shah, 2nd Edition, Pearson



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Syllabus for BBA Admission Batch 2022

WORKING DAY	DAY	LESSON PLAN – DESCRIPTION
Module 1 & 2 -Prof. (Dr.) Shweta Kishore		
1	1	Syllabus Discussion
2	2	Module 1: Introduction to SC <ul style="list-style-type: none"> • Definition of Supply Chain Management (SCM) • Key components of a supply chain: suppliers, manufacturers, distributors, retailers, and customers. • Role of SCM in modern business and its impact on customer satisfaction, cost reduction, and competitive advantage.
3	3	Evolution of SC: <ul style="list-style-type: none"> • Early Supply Chains (pre-industrial era). • Industrial Revolution and its impact on SCM. • The rise of logistics and transportation. • Technological advancements and global supply chains.
4	4	SC stages: <ul style="list-style-type: none"> • Importance of each stage and its interdependencies. • Case Study Application: Zara
5	5	Objectives of SC, SC Decision Phases: <ul style="list-style-type: none"> • Key objectives that organizations aim to achieve through effective supply chain management. • Different phases of decision-making in SCM. • Case Study Application: Amazon: Online Sales • Analyze how Amazon manages these phases at different levels to maintain its competitive advantage.
6	6	Decisions in SC <ul style="list-style-type: none"> • Decisions made in SCM and their impact on the business • Case Study Application: Amazon

		<ul style="list-style-type: none"> Examine how Amazon leverages data for decision-making in inventory management, demand forecasting, and supply chain planning.
7	7	<p>Process View of SC, Cycle view and Push-Pull view</p> <ul style="list-style-type: none"> Process view of SCM and the different processes involved Case Study Application: Toyota Analyze Toyota's hybrid push-pull system, especially in the Just-in-Time (JIT) manufacturing process.
8	8	<p>Extended SC, SC Integration</p> <ul style="list-style-type: none"> Importance of extending and integrating supply chains
9	9	<p>Performance Metrics, Challenges in SC</p> <ul style="list-style-type: none"> Key Performance Indicators and different challenges for the supply chain
10	10	Summary of the entire module and open discussion on challenges and future trends in SCM.
11	11	<p>Module 2: Supply Chain Framework & Drivers</p> <ul style="list-style-type: none"> To introduce the concept of impellers (factors that accelerate) of the supply chain and the key drivers that determine its performance.
12	12	<p>Drivers of Supply Chain Performance</p> <ul style="list-style-type: none"> Explore the key drivers that determine supply chain performance. Discuss how companies like Amazon optimize their drivers to enhance performance.
13	13	<p>Framework for Structuring Supply Chain Drivers</p> <p>Introduce a framework for understanding how to structure and optimize supply chain drivers.</p>
14	14	<p>Facilities as a Supply Chain Driver</p> <p>To explore the role of facilities (warehouses, factories, distribution centers) in the supply chain and how they impact performance.</p>

15	15	<p>Inventory as a Supply Chain Driver</p> <p>To understand the role of inventory in the supply chain and the techniques for managing it effectively.</p>
16	16	<p>Transportation as a Supply Chain Driver</p> <p>To analyze the transportation driver in supply chains, focusing on its role in cost, speed, and reliability.</p>
17	17	<p>Information as a Supply Chain Driver</p> <p>To highlight the importance of information as a critical driver in managing and coordinating supply chains.</p>
18	18	<p>Sourcing as a Supply Chain Driver</p> <p>To understand how sourcing (procurement and supplier management) affects the efficiency and competitiveness of a supply chain.</p>
19	19	<p>Pricing as a Supply Chain Driver</p> <p>To explore the role of pricing in a supply chain and how it influences demand, profitability, and competitiveness.</p>
20	20	<p>Integrating the Six Supply Chain Drivers and Performance Metrics</p> <p>To integrate the six drivers of supply chain performance and explore how they can be optimized together</p> <ul style="list-style-type: none"> • Case Study: 7 Eleven Japan Co.
Module 3 & 4 (Prof. Tanmoy Chakraborty)		
1	1	Module 3: Introduction to Logistics management & Logistics Mix

Subject Name: Advanced Data Analytics Credit:4

Lecture Hours: 40

		To introduce the concept of logistics management, its importance in supply chains, and the components of the logistics mix.
2	2	Transportation: Role of Transportation, Selection criteria, Modes of Transportation, Intermodal Transportation: <ul style="list-style-type: none"> • Understand the critical role of transportation in logistics and supply chain management. • Explore the criteria used to select transportation modes and strategies for different logistics needs.
3	3	Transportation Network, Freight Management <ul style="list-style-type: none"> • Explore the structure of transportation networks and the management of freight.
4	4	Containerization, Video Discussion on Containerization <ul style="list-style-type: none"> • Understand containerization and its role in streamlining transportation and improving logistics efficiency.
5	5	Warehousing: Objectives, Functions, Video Discussion on Warehousing <ul style="list-style-type: none"> • Introduce warehousing and understand its functions and importance in logistics.
6	6	Warehouse options, Warehouse Site selection, Layout Design, Warehouse Strategies <ul style="list-style-type: none"> • Explore warehouse site selection, layout design, and operational strategies.
7	7	Material Handling and Storage, Video Discussion on Material Handling
8	8	Packaging: Consumer and Logistical packaging, Unitization, Packaging Material, Returnable Logistical Packaging, Packaging Cost
9	9	Case Study: <ul style="list-style-type: none"> • Cadbury Products
10	10	Case Study: <ul style="list-style-type: none"> • ROX Doc Care • Suman Crop Protection

11	11	<p>Module 4: Recent Trends in Supply chain & Logistics Management</p> <p>Introduction to Sustainability in Supply Chain</p> <p>Introduce the concept of sustainability and its importance in modern supply chain management.</p>
12	12	<ul style="list-style-type: none"> • Green Supply Chain Management, Video Discussion on Green SCM • Explore Green Supply Chain Management (GSCM) and its strategies for achieving sustainable practices in supply chains.
13	13	<ul style="list-style-type: none"> • Reverse Supply Chain • Understand the concept and operations of Reverse Supply Chain (RSC) and its role in sustainability.
14	14	<ul style="list-style-type: none"> • Vendor managed inventory • Explore Vendor Managed Inventory (VMI) and its impact on inventory management, cost reduction, and collaboration.
15	15	<p>Bar-coding & RFID, Implementation of RFID</p> <p>Role of barcoding and RFID in improving supply chain visibility and efficiency.</p>
16	16	<p>Role of IT in the Supply Chain</p> <p>Explore the role of Information Technology (IT) in enhancing supply chain operations and decision-making.</p>
17	17	<ul style="list-style-type: none"> • E-Business and the Supply Chain • Understand the role of E-business and digital platforms in transforming supply chains
18	18	<ul style="list-style-type: none"> • Cold Chain Logistics • Explore Cold Chain Logistics and its importance in the transportation of temperature-sensitive goods.
19	19	<ul style="list-style-type: none"> • AI in Supply Chain • Understand the role of AI in transforming supply chain management through automation, data analytics, and decision-making
20	20	<p>Integrating Sustainability and Technology in Supply Chain</p> <p>Integrate sustainability practices with emerging technologies in the supply chain, including AI, IT, and Green SCM</p> <p>Case Study:</p> <ul style="list-style-type: none"> • Indian Paints • Zara

Subject Code: BBABA602

**Pre-requisite: Basic knowledge of Python programming, Algorithm
And basic knowledge of data analytics**

Relevant Links:

[BBABB602 Study Material and Syllabus.docx](#)

[NPTEL](#)

[Coursera](#)

COURSE OBJECTIVES:

1. To describe the role of data analytics and decision support systems in business and record the current issues with those of the firm to solve business problems.
2. To introduce the fundamental principles of computer-based information analysis and design and develop an understanding of the principles and techniques used.
3. To enable students to understand the various knowledge representation methods and different expert system structures as strategic weapons to counter the threats to business and make business more competitive.
4. To enable the students to use of data analysis to assess the impact of Technology on electronic commerce and electronic business and understand the specific threats and vulnerabilities of computer systems.

COURSE OUTCOMES:

CO1: The students will be able to relate the basic concepts and technologies used in the field of data analytics.

CO2: The students will be able to compare the processes of developing and implementing data analytics algorithms.

CO3: The students will be able to examine the role of the ethical, social, and security issues of data analytics systems.

CO4: The students will be able to investigate and translate the role of data analytics in organizations, and the strategic management processes, with the implications for the management.

Module number	Topic	Sub-topics	Mapping with Industry and International Academia	Lecture Hours	Corresponding Lab Assignment
1	Linear Regression Analysis :	<p>Simple Linear Regression: Introduction – Overview – Importance -Least Square Method– Normal Equations - Calculation of Regression Coefficients – Properties of Regression Line – Uses of Regression;</p> <ul style="list-style-type: none"> • Multiple Linear Regression: Overview – Importance - Least Square Method – Normal Equations – Calculation of Regression Coefficients - Properties of OLS Regression Line – Properties of OLS Estimators – BLUE Properties – Measuring Goodness of FIT –Adjusted R square – Testing Overall Significance of Regression – Testing Relevance of an Additional Explanatory Variable 	<p>International Academia: https://ocw.mit.edu/courses/18-s096-topics-in-mathematics-with-applications-in-finance-fall-2013/resources/lecture-6-regression-analysis/</p> <p>Industry Mapping: Creating a Predictive model</p>	12	<p>Simple Linear Regression: Introduction – Overview – Importance -Least Square Method– Normal Equations - Calculation of Regression Coefficients – Properties of Regression Line – Uses of Regression;</p> <p>1. Multiple Linear Regression: Overview – Importance - Least Square Method –Normal Equations – Calculation of Regression Coefficients - Properties of OLS</p>
2	Binary Logistic Regression	<p>Basic concept of Logistic Regression – Assessing the Model –</p> <ul style="list-style-type: none"> • log-likelihood statistic – deviance statistic – R and R2 – Wald Statistic – odds ratio – Sources of Bias and Common Problems - Interpreting Binary Logistic Regression 	<p>International Academia: https://ocw.mit.edu/courses/15-071-the-analytics-edge-spring-2017/pages/logistic-regression/</p> <p>Industrial Mapping : Predictive model creation</p>	12	<p>Basic concept of Logistic Regression – Assessing the Model –</p> <p>1. log-likelihood statistic – deviance statistic – R and R2</p>
3	Factor Analysis	<ul style="list-style-type: none"> • Basic concept of Factor Analysis, Factor Analysis Model, Statistics Associated with Factor Analysis, Factor Analysis Process – Formulate the Problem – Construct the Correlation Matrix- Determine the method of Factor Analysis –Determine the number of Factors – Factor Extraction eigenvalues and scree plot- Factor Rotation – Interpret Factors – Calculate Factor Scores - Determine Model Fit. 	<p>International Academia: https://ocw.mit.edu/courses/18-s096-topics-in-mathematics-with-applications-in-finance-fall-2013/resources/lecture-15-factor-modeling/</p> <p>Industrial Mapping : Predictive model creation</p>	12	<p>Basic concept of Factor Analysis, Factor Analysis Model, Statistics Associated with Factor Analysis, Factor Analysis Process – Formulate the Problem – Construct the</p>

					Correlation Matrix- Determine the method of Factor Analysis –
4	Cluster Analysis	<ul style="list-style-type: none"> • Basic concept of Cluster Analysis, Statistics Associated with Cluster Analysis, Cluster Analysis Process - Formulate the Problem – Select a distance measure – Select a clustering procedure – Decide on the number of Clusters – Interpret and Profile Cluster – Asses the reliability and validity . 	International Academia: https://ocw.mit.edu/courses/6-0002-introduction-to-computational-thinking-and-data-science-fall-2016/resources/lecture-12-clustering/ Industrial Mapping : Predictive model creation	12	Basic concept of Cluster Analysis, Statistics Associated with Cluster Analysis, Cluster Analysis Process

Text Book:

- Business Analytics: An Application Focus by P Halady, Prentice Hall India Learning Private Limited

References:

1. Sankar Kumar Bhaumik: Principles of Econometrics, Oxford University Press
2. Basic Econometrics - D.N. Gujarati and D.C. Porter, Tata McGraw Hill.
3. Marketing Research – An Applied Orientation by Naresh K. Malhotra and Satyabhusan Das, Pearson India Education Services Pvt. Ltd



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Syllabus for B.B.A. Admission Batch 2022

Subject Name: Advanced Data Analytics - Laboratory

Credit: 2

Lecture Hours: 20

Subject Code: BBABA692

Pre-requisite: Basic knowledge of programming

Module number	Topic	Sub-topics	TextBook	Mapping with Industry and International Academia	Lecture Hours
1	Regression Application	<ul style="list-style-type: none"> Multiple Linear Regression: Overview – Importance - Least Square Method -- Normal Equations – Calculation of Regression Coefficients - Properties of OLS Regression Line – Properties of OLS Estimators – BLUE Properties – Measuring Goodness of FIT –Adjusted R square – Testing Overall Significance 	Business Analytics: An Application Focus by P Halady, Prentice Hall India Learning Private Limited	<p>International Standards: https://ocw.mit.edu/courses/18-s096-topics-in-mathematics-with-applications-in-finance-fall-2013/resources/lecture-6-regression-analysis/</p> <p>Industry Mapping: Creating a Predictive model</p>	10

		of Regression – Testing Relevance of an Additional Explanatory Variable			
2	Cluster Analysis	Basic concept of Cluster Analysis, Statistics Associated with Cluster Analysis, Cluster Analysis Process - Formulate the Problem – Select a distance measure – Select a clustering procedure – Decide on the number of Clusters – Interpret and Profile Cluster – Asses the reliability and validity	Business Analytics: An Application Focus by P Halady, Prentice Hall India Learning Private Limited	International Standards https://ocw.mit.edu/courses/6-0002-introduction-to-computational-thinking-and-data-science-fall-2016/resources/lecture-12-clustering/	10
				Industry Mapping: Predictive model creation	

Lesson Plan: Faculty – Prof. Kamalika Dasgupta

Days	Lesson Plan Description
Module 1: Linear Regression Analysis	
Day 1	Introduction to Linear Regression: Overview of Regression Analysis, importance, and types.
Day 2	Simple Linear Regression: Definition, assumptions, model building, and interpretation.
Day 3	Estimation Methods in Linear Regression: Ordinary Least Squares (OLS) method, maximum likelihood estimation.
Day 4	Data Preparation: Exploring data for linear regression, checking assumptions (normality, linearity, homoscedasticity).
Day 5	Fitting Simple Linear Regression: Hands-on examples using datasets.
Day 6	Model Evaluation: Understanding R-squared, Adjusted R-squared, residual analysis.
Day 7	Multiple Linear Regression: Extending simple regression to multiple predictors, interaction terms.

Days	Lesson Plan Description
Day 8	Model Assumptions and Diagnostics: Multicollinearity, homoscedasticity, normality of residuals, checking assumptions.
Day 9	Multicollinearity and VIF: Variance Inflation Factor and how to handle multicollinearity.
Day 10	Model Selection Techniques: Stepwise regression, AIC/BIC criteria.
Day 11	Overfitting and Underfitting: Understanding bias-variance tradeoff.
Day 12	Regularization Methods: Introduction to Lasso and Ridge regression for model tuning.
Day 13	Model Interpretation: Coefficients, significance tests, and confidence intervals in regression.
Day 14	Case Study: Hands-on project on Linear Regression with a real dataset.
Module 2: Binary Logistic Regression	
Day 15	Introduction to Logistic Regression: Overview and when to use logistic regression for classification.
Day 16	The Logistic Function: Understanding the sigmoid function, odds, and log-odds.
Day 17	Model Building in Logistic Regression: Creating binary outcome models, estimation techniques.
Day 18	Assumptions of Logistic Regression: Exploring independence, linearity in the logit, and large sample size.
Day 19	Model Interpretation: Interpreting coefficients, odds ratio, and their significance.
Day 20	Evaluating Model Performance: Confusion matrix, accuracy, precision, recall, F1-score.
Day 21	Model Evaluation Metrics: ROC curve, AUC, and their importance in classification.
Day 22	Regularization in Logistic Regression: Lasso and Ridge for logistic regression.
Day 23	Model Diagnostics: Identifying influential observations, multicollinearity, and outliers.
Day 24	Dealing with Imbalanced Data: Techniques like SMOTE, resampling, and cost-sensitive learning.
Day 25	Advanced Topics in Logistic Regression: Multinomial and ordinal logistic regression.
Day 26	Model Validation: Cross-validation and validation techniques for logistic models.
Day 27	Case Study: Hands-on project on Binary Logistic Regression with a real dataset.

Days	Lesson Plan Description
Lesson Plan: Faculty – Prof. Sayan Karmakar	
Module 3: Factor Analysis	
Day 28	Introduction to Factor Analysis: Purpose, applications, and types of factor analysis.
Day 29	Assumptions of Factor Analysis: Linearity, normality, and large sample size.
Day 30	Exploratory Factor Analysis (EFA): Steps, factor extraction, and rotation methods.
Day 31	Factor Loadings and Interpretation: How to interpret factor loadings and variance explained.
Day 32	Factor Extraction Methods: Principal Component Analysis (PCA) vs. Principal Axis Factoring (PAF).
Day 33	Factor Rotation Techniques: Orthogonal vs. oblique rotation, Varimax, and Promax.
Day 34	Determining the Number of Factors: Eigenvalues, Scree plot, and Kaiser criterion.
Day 35	Confirmatory Factor Analysis (CFA): Model specification, fit indices, and hypothesis testing.
Day 36	Factor Scores: Computing and interpreting factor scores.
Day 37	Applications of Factor Analysis: Using factor analysis for data reduction and structure identification.
Day 38	Case Study: Hands-on project on Factor Analysis with a real dataset.
Module 4: Cluster Analysis	
Day 39	Introduction to Cluster Analysis: What is clustering, types of clustering (hierarchical, partitional).
Day 40	K-means Clustering: Algorithm, choosing the number of clusters, and interpretation of results.
Day 41	Hierarchical Clustering: Agglomerative vs. divisive, dendrogram, and linkage methods.
Day 42	Model Evaluation in Clustering: Silhouette score, Davies-Bouldin index.
Day 43	Advanced Clustering Techniques: DBSCAN, Gaussian Mixture Models, and their applications.
Day 44	Dimensionality Reduction for Clustering: PCA and t-SNE in the context of clustering.
Day 45	Applications of Clustering: Market segmentation, anomaly detection, image segmentation.

Days	Lesson Plan Description
Day 46	Visualizing Cluster Results: Using PCA, t-SNE, and other visualization techniques for clusters.
Day 47	Model Tuning in Clustering: Hyperparameter tuning for clustering algorithms.
Day 48	Case Study: Hands-on project on Cluster Analysis with a real dataset.

QUESTION PAPER PATTERN AND DATES

EXAMINATION	Dates	PART – A	PART – B	PART – C	TOTAL MARKS
Mid Term 1	February 10, 2025 to February 21, 2025	Attempt 5 out of 10 questions; Each question carries 2 marks (2 × 5)	Attempt 2 out of 4 questions; Each question carries 5 marks (5 × 2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10 × 1)	30
Mid Term 2	March 24, 2025 to April 2, 2025	Attempt 5 out of 10 questions; Each question carries 2 marks (2 × 5)	Attempt 2 out of 4 questions; Each question carries 5 marks (5 × 2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10 × 1)	30
End Semester Examination	April 21, 2025 to May 9, 2025	Attempt 10 out of 15 questions; Each question carries 2 marks (2 × 10)	Attempt 6 out of 9 questions; Each question carries 5 marks (5 × 6)	Attempt 5 out of 8 questions; Each question carries 10 marks (10 × 5)	100

Examination Rules & Regulations:

https://iemcollegemy.sharepoint.com/:b:/g/personal/iemcoe_office_iem_edu_in/EXrcoe3d6oxIogHKO074XeUBC9qm3XNaf_qUeSiVTN_h5OQ?e=MMQn40



University of Engineering and Management
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Institute of Engineering & Management, New Town Campus
University of Engineering & Management, Jaipur
Syllabus for BBA in Business Analytics Admission Batch 2022

Subject Name: Econometrics

Credit: 4

Lecture Hours: 40

Subject Code: BBABA603

[Study Material](#) [Coursera](#) [NPTEL](#) [LinkedIn Learning](#)

Course Objective:

1. To understand the econometric theory and arguments used in the economics literature.
2. To apply econometric techniques to real-world economic issues, demonstrating the ability to use econometrics as a tool for empirical analysis and policy evaluation.
3. To construct econometric models from the economic model, and to estimate the model's parameters using regression analysis starting from the ordinary least squares (OLS) estimation method.
4. Students will be introduced to statistical software packages used to estimate regression models.

Course Outcome:

CO1: Students will learn to specify and formulate economic models, including choosing the appropriate functional forms and variables to represent economic relationships.

CO2: Students will learn to test the empirical validity of economic theory and models using empirical data and forecast future trends.

CO3.Students will be able to estimate and interpret linear regression models and be able to distinguish between economic and statistical importance
CO4.They will be able to use a statistical/econometric computer package to estimate an econometric model and be able to report the results of their work in a non-technical and literate manner.

Module number	Topic	Sub-topics	TextBook	Mapping with Industry and International Academia	Lecture Hours	Corresponding Lab / Case-Study Assignment
1	Nature and Scope of Econometrics	<p>1.1 Distinction between Economic Model and Econometric model</p> <p>1.2 Steps in formulating Econometric model (Specification, Estimation, Testing of Hypothesis, Forecasting)</p> <p>1.3 Structure of Economic Data (cross-section, time series, pooled, panel)</p> <p>1.4 Application of Econometrics in Management.</p> <p>1.5 The nature of regression analysis: regression versus causation; regression versus correlation</p>	<p>Principles of Econometrics A Modern Approach Using EViews, Sankar Kumar Bhaumik, Oxford University Press</p> <p>Chapter – 1</p> <p>Study Material – Module 1</p>	<p>International Standards:</p> <p>https://ocw.mit.edu/courses/15-015-macro-and-international-economics-fall-2011/resources/mit15_015f11_lec01/</p> <p>https://ocw.mit.edu/courses/14-02-principles-of-macroeconomics-fall-2004/resources/lecture2/</p> <p>https://archive.nptel.ac.in/courses/130/106/130106001/</p> <p>Industry Mapping:</p> <p><i>Data analysis in Stata</i></p>	10 Hours	Building regression model using stata
2	Classical Linear	2.1 Definition of Simple Linear Regression Model (SLRM).		<p>International Standards:</p>	10 Hours	Estimation of Simple Linear Regression Model

	<p>Regression Model: Properties and Estimation</p>	<p>2.2 The classical assumptions (basic interpretation).</p> <p>2.3 Concepts of population regression function and sample regression function.</p> <p>2.4 Estimation of model by method of ordinary least squares.</p> <p>2.5 Economic interpretations of the estimated model.</p> <p>2.6 Properties of the Least Squares Estimators (BLUE) in SLRM- Gauss-Markov theorem.</p>	<p>Principles of Econometrics A Modern Approach Using EViews, Sankar Kumar Bhaumik, Oxford University Press</p> <p>Chapter-2</p> <p>Study Material – Module 2</p>	<p>https://ocw.mit.edu/courses/15-071-the-analytics-edge-spring-2017/pages/linear-regression/the-statistical-sommelier-an-introduction-to-linear-regression/</p> <p>(https://web.stanford.edu/class/archive/ee/ee108a/ee108a.1082/schedule.html)</p> <p>https://archive.nptel.ac.in/courses/130/106/130106001/</p> <p>Industry Mapping: <i>Data analysis in Stata</i></p>		<p>using OLS technique in stata</p>
3	<p>Statistical inference in linear regression model</p>	<p>3.1 Use of standard normal, chi2, t, and F statistics in linear regression model.</p> <p>3.2 Testing hypothesis Single test (t test and chi2 test) Joint test (F test).</p> <p>3.3 Goodness of fit (in terms of R2, adjusted R2 and F statistic).</p> <p>3.4 Statistical significance and economic importance.</p>	<p>Principles of Econometrics A Modern Approach Using EViews, Sankar Kumar Bhaumik, Oxford University Press</p> <p>Chapter-2</p> <p>Study Material – Module 3</p>	<p>International Standards:</p> <p>https://ocw.mit.edu/courses/14-30-introduction-to-statistical-method-in-economics-spring-2006/pages/lecture-notes/</p> <p>https://archive.nptel.ac.in/courses/130/106/130106001/</p>	10 Hours	<p>Testing of hypothesis using stata</p>

				Industry Mapping: Data analysis in Stata		
4	Violations of Classical Assumptions	4.1 Multicollinearity - Consequences, Detection (Variance Inflationary Factor (VIF)) and Remedies. 4.2 Heteroscedasticity - Consequences, Detection (Lagrange Multiplier test) and Remedies. 4.3 Autocorrelation - Consequences, Detection (Durbin-Watson test) and Remedies	Principles of Econometrics A Modern Approach Using EViews, <u>Sankar Kumar Bhaumik</u> , Oxford University Press Chapter-4, 5, 6 Study Material – Module 4	International Standards: https://ocw.mit.edu/courses/15-071-the-analytics-edge-spring-2017/pages/linear-regression/the-statistical-sommelier-an-introduction-to-linear-regression/video-6-correlation-and-multicollinearity/ https://archive.nptel.ac.in/courses/130/106/130106001/ Industry Mapping: Data analysis in Stata	10 Hours	Detection of Multicollinearity, Heteroscedasticity, Autocorrelation using stata.

Submitted by Dr. Debarati Ghosh, IEM Saltlake campus

TextBook:

Principles of Econometrics A Modern Approach Using EViews, Sankar Kumar Bhaumik, Oxford University Press

Reference Books:

Wooldridge, Jeffrey M. (2013), *Introductory Econometrics – A Modern Approach*, CENGAGE learning

Gujarati, Damodar (2004), *Basic Econometrics*, McGraw-Hill



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Syllabus for BBA in Business Analytics Admission Batch 2022

Subject Name: Econometrics-Laboratory

Credit: 2

Lecture Hours: 20

Subject Code: BBABA693

Module number	Topic	Sub-topics	TextBook	Mapping with Industry and International Academia	Lecture Hours
1	Module I:	Use of Econometric Software: Stata – Data Management, Generating Variables, Describing Data, Graphs, Logical Operators in Stata, Functions Used in Stata	Panchanan Das: Econometrics in Theory and Practice, Analysis of Cross Section, Time Series and Panel Data with Stata 15.1, Springer Nature Singapore Pte Ltd. 2019. , Wiley	<i>International Standards</i> Data Visualization in Stata Coursera <i>Industry Mapping:</i> Data Visualization in stata	6 Hours
2	Module II:	Linear Regression Model by Using Stata :	Panchanan Das: Econometrics in Theory and Practice,	<i>International Standards</i> The STATA OMNIBUS:	6 Hours

		<p>OLS Estimation in Stata.</p> <p>Use of standard normal, chi2, t, and F statistics in linear regression model.</p> <p>Interpretation of Regression output.</p>	<p>Analysis of Cross Section, Time Series and Panel Data with Stata 15.1, Springer Nature Singapore Pte Ltd. 2019.</p>	<p>Regression and Modelling with STATA Coursera</p> <p><i>Industry Mapping:</i> Estimation of Simple Linear Regression Model using OLS technique in stata</p>	
3	Module III:	<p>Heteroscedasticity, Autocorrelation, Multicollinearity: Illustration by Using Stata</p>	<p>Panchanan Das: Econometrics in Theory and Practice, Analysis of Cross Section, Time Series and Panel Data with Stata 15.1, Springer Nature Singapore Pte Ltd. 2019.</p>	<p><i>International Standards :</i> NPTEL :: Economics - NOC: Introduction to Econometrics</p> <p><i>Industry Mapping:</i> Detection of Multicollinearity, Heteroscedasticity, Autocorrelation using stata.</p>	8 Hours

Suggested Readings:

Panchanan Das: Econometrics in Theory and Practice, Analysis of Cross Section, Time Series and Panel Data with Stata 15.1, Springer Nature Singapore Pte Ltd. 2019.

Lesson Plan:

Module 1: Nature and Scope of Econometric

WORKING DAY	LESSON PLAN – DESCRIPTION
1	Overview of Econometrics: What is Econometrics and its scope.

	<p>Key differences between Economics and Econometrics.</p> <p>Understanding the role of Econometrics in decision-making and policy analysis.</p>
2	<p>Definitions of Economic Models vs Econometric Models.</p> <p>Characteristics and examples of each.</p> <p>Practical applications of each in economics.</p> <p>Class discussion on how econometric models are built from economic theories.</p>
3	<p>Steps in Formulating Econometric Models:</p> <ul style="list-style-type: none"> □ The four steps: Specification, Estimation, Hypothesis Testing, and Forecasting. □ How to move from theory to practical econometric modeling □ Hands-on example of a simple econometric model.
4	<p>Structure of Economic Data: Cross-section, Time Series, Pooled, and Panel Data, Understanding data types and their uses in econometrics.</p>
5	<p>How econometrics is used in business and management decision-making (e.g., demand forecasting, pricing strategy, inventory management), Case study on the application of econometrics in a business context.</p>
6	<p>Understanding the difference between correlation and causation, Discussion on how regression analysis helps identify causal relationships, Real-world examples where regression helps infer causality.</p>

Module 2: Classical Linear Regression Model: Properties and Estimation

WORKING DAY	LESSON PLAN – DESCRIPTION
7	What is Simple Linear Regression? Definition and components of the SLRM. Introduction to the assumptions of linear regression.
8	Practical: Simple Linear Regression in Stata.
9	The 5 classical assumptions for linear regression: Linearity, No perfect multicollinearity, Homoscedasticity, No autocorrelation, Exogeneity. Why these assumptions matter for the validity of regression estimates.
10	Practical: Visualizing assumptions using data examples.
11	Defining Population Regression Function (PRF) and Sample Regression Function (SRF). The role of the PRF in formulating hypotheses and the SRF in estimation.
12	Practical: Computing SRF using sample data
13	Introduction to the OLS method: The theory behind OLS estimation. Deriving OLS estimators.
14	Practical: Estimating a simple linear regression model using OLS in Stata
15	How to interpret the coefficients of the regression model economically. The significance of each coefficient and its impact on decision-making.
16	Understanding the Gauss-Markov theorem and why OLS estimators are BLUE (Best Linear Unbiased Estimators).
17	Practical: Hands-on examples demonstrating BLUE estimators in practice.

18	Practical: Review of SLRM estimation using OLS and practical examples in Stata, In-class practice session using real-world data.
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Module 3: Statistical inference in linear regression model

WORKING DAY	LESSON PLAN – DESCRIPTION
19	Statistical Inference in Linear Regression: Introduction to hypothesis testing in econometrics.
20	Setting up and testing null hypotheses using t-tests and F-tests.
21	Practical: Hypothesis testing in a simple regression model.
	Single hypothesis tests for individual regression coefficients. Understanding the logic and application of t-tests and χ^2 tests.
22	Practical: Conducting t-tests and χ^2 tests in Stata.
23	Introduction to joint hypothesis testing: The F-test for comparing multiple regression models. How to interpret the F-statistic and its importance.
24	Practical: Conducting an F-test in Stata
25	Goodness of Fit in Regression Models: Understanding R^2 and Adjusted R^2 as measures of model fit. The role of the F-statistic in assessing overall model significance.
26	Practical: Calculating and interpreting these metrics using regression outputs.

27	Differentiating between statistical significance and economic significance. How to make decisions based on both statistical tests and economic considerations.
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Module 4: Violations of Classical Assumptions

WORKING DAY	LESSON PLAN – DESCRIPTION
28	What is multicollinearity, and why is it problematic for regression models? Causes of multicollinearity
29	Detection of multicollinearity
30	Remedies for multicollinearity.
31	Practical: Detecting multicollinearity in Stata.
32	Understanding heteroscedasticity and its effects on regression results. Causes of heteroscedasticity
33	Detection of heteroscedasticity
34	Remedies for heteroscedasticity (e.g., weighted least squares).
35	Practical: Running heteroscedasticity tests in Stata
36	Understanding autocorrelation and its impact on regression analysis. Causes of autocorrelation

37	Detection of autocorrelation
38	Remedies for autocorrelation (e.g., using lagged variables or generalized least squares).
39	Practical: Detection of autocorrelation in stata
40	Final Review and Course Wrap-up.
41	Review all key topics, answer student questions, and finalize the course with a discussion on further study and research in econometrics.

Text Book:

Principles of Econometrics A Modern Approach Using EViews, Sankar Kumar Bhaumik, Oxford University Press

Reference Books:

Wooldridge, Jeffrey M. (2013), *Introductory Econometrics – A Modern Approach*, CENGAGE learning

Gujarati, Damodar (2004), *Basic Econometrics*, McGraw-Hill



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Syllabus for BBA(Business Analytics) Admission Batch 2022

Subject Name: Data Mining

Credit: 4

Lecture Hours: 40

Subject Code: BBABA604

[Study Material and Syllabus.docx](#)

[MIT OpenCourseWare](#)

[Data Mining NPTEL](#)

COURSE OBJECTIVES:

1. To provide a comprehensive understanding of emerging technologies such as Data warehousing, feature engineering etc.
2. To explore the applications, implications, and strategic advantages of emerging technologies in business for competitive advantage.

COURSE OUTCOMES:

CO	Details
1	Students will understand foundational knowledge of emerging technologies such as Data warehousing, feature engineering and comprehending their principles, components, and functionalities.
2	Students will analyze the practical applications of these technologies in various business contexts, evaluating how they can optimize operations, enhance decision-making, and drive innovation.
3	Students will evaluate the strategic implications of adopting emerging technologies, including potential challenges, risks, and opportunities, to formulate informed strategies for competitive advantage.
4	Students will develop skills to plan and manage the integration of emerging technologies into business processes, ensuring alignment with organizational goals and effective change management

Module number	Topic	Sub-topics	Text Book as per Syllabus	Mapping with Industry and International Academia	Lecture Hours	Corresponding Lab/Case Study Assignment
1	Introduction to Data Mining	<ul style="list-style-type: none"> • Why Data mining? • What kinds of data can be mined? • What kind of data can be mined? • What are the technologies are used? • Which kinds of applications are targeted? • Major issues in Data mining 	Introduction to data mining with Case studies by G. K. Gupta	International Academia: Stanford Opencourseware Data Mining Sloan School of Management MIT OpenCourseWare Industry Mapping: Understand the types and magnitude of data we use in the industry	12	Working on basic data understanding and types of data
2	Data Preprocessing	<ul style="list-style-type: none"> • Data Preprocessing: An Overview • Data Cleaning • Data Integration • Data Reduction 	Introduction to data mining with Case studies by G. K. Gupta	International Academia: Stanford Opencourseware	12	Preparing data for analysis using algorithms using python
3	Mining Frequent Patterns, Associations, and Correlations	<ul style="list-style-type: none"> • Basic Concepts: Market Basket Analysis • Frequent Itemset Mining Methods • Pattern Evaluation Methods 	Introduction to data mining with Case studies by G. K. Gupta	International Standards: Stanford OpenCourse Data Mining Sloan School of	12	Understanding relationships between data using various algorithms
4	Classification Basic Concepts	<ul style="list-style-type: none"> • Basic concepts of classification • Decision tree Induction • Bayes Classification methods • Rule based classification 	Introduction to data mining with Case studies by G. K. Gupta	International Standards: MIT OpenCourse Data Mining Sloan School of Management MIT OpenCourseWare	18	Applying the algorithms of classification using python

		<ul style="list-style-type: none"> • Model evaluation and selection • Techniques to improve classification accuracy 		<p><i>Industry Mapping:</i> Understand classification algorithms which are common in the industry</p>		
5	Cluster Analysis and Outlier Detection	<ul style="list-style-type: none"> • Cluster Analysis • Partitioning methods • Outlier and outlier analysis • Outlier detection methods • Statistical approaches • Clustering-based approaches • Data mining applications • Data mining and society 	Introduction to data mining with Case studies by G. K. Gupta	<p><i>International Standards:</i> MITOpenCourse</p> <p>Data Mining Sloan School of Management MIT OpenCourseWare</p> <p><i>Industry Mapping:</i> Understand the clustering algorithms and implement in the industry data</p>	18	Applying the algorithms of clustering using python



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Syllabus for BBA(Business Analytics) Admission Batch 2022

Subject Name: Data Mining - Laboratory Credit: 2

Lecture Hours: 20

Subject Code: BBABA694

[Study Material and Syllabus.docx](#)

[MIT OpenCourseWare](#)

[Data Mining NPTEL](#)

COURSE OBJECTIVES:

1. To provide a comprehensive understanding of emerging technologies such as Data warehousing, feature engineering etc.
2. To explore the applications, implications, and strategic advantages of emerging technologies in business for competitive advantage.

COURSE OUTCOMES:

CO	Details
1	Students will understand foundational knowledge of emerging technologies such as Data warehousing, feature engineering and comprehending their principles, components, and functionalities.
2	Students will analyze the practical applications of these technologies in various business contexts, evaluating how they can optimize operations, enhance decision-making, and drive innovation.
3	Students will evaluate the strategic implications of adopting emerging technologies, including potential challenges, risks, and opportunities, to formulate informed strategies for competitive advantage.
4	Students will develop skills to plan and manage the integration of emerging technologies into business processes, ensuring alignment with organizational goals and effective change management

Module number	Topic	Sub-topics	Text Book as per Syllabus	Mapping with Industry and International Academia	Lecture Hours	Corresponding Lab/Case Study Assignment
1	Introduction to Data Mining	<ul style="list-style-type: none"> • Why Data mining? • What kinds of data can be mined? • What kind of data can be mined? • What are the technologies are used? • Which kinds of applications are targeted? • Major issues in Data mining 	Introduction to data mining with Case studies by G. K. Gupta	<p>International Academia: Stanford Opencourseware Data Mining Sloan School of Management MIT OpenCourseWare</p> <p>Industry Mapping: Understand the types and magnitude of data we use in the industry</p>	12	Working on basic data understanding and types of data
2	Data Preprocessing	<ul style="list-style-type: none"> • Data Preprocessing: An Overview • Data Cleaning • Data Integration • Data Reduction • Data Reduction • Data Transformation 	Introduction to data mining with Case studies by G. K. Gupta	<p>International Academia: Stanford Opencourseware Data Mining Sloan School of Management MIT OpenCourseWare</p> <p>Industry Mapping: How to preprocess data for best fit results</p>	12	Preparing data for analysis using algorithms using python

3	Mining Frequent Patterns, Associations, and Correlations	<ul style="list-style-type: none"> • Basic Concepts: Market Basket Analysis • Frequent Itemset Mining Methods • Pattern Evaluation Methods 	Introduction to data mining with Case studies by G. K. Gupta	International Standards: StandFord OpenCourse Data Mining Sloan School of Management MIT OpenCourseWare Industry Mapping: Algorithms to implement in data mining	12	Understanding relationships between data using various algorithms
4	Classification Basic Concepts	<ul style="list-style-type: none"> • Basic concepts of classification • Decision tree Induction • Bayes Classification methods • Rule based classification • Model evaluation and selection • Techniques to improve classification accuracy 	Introduction to data mining with Case studies by G. K. Gupta	International Standards: MITOpenCourse Data Mining Sloan School of Management MIT OpenCourseWare Industry Mapping: Understand classification algorithms which are common in the industry	18	Applying the algorithms of classification using python
5	Cluster Analysis and Outlier Detection	<ul style="list-style-type: none"> • Cluster Analysis • Partitioning methods • Outlier and outlier analysis • Outlier detection methods • Statistical approaches • Clustering-based approaches • Data mining applications 	Introduction to data mining with Case studies by G. K. Gupta	International Standards: MITOpenCourse Data Mining Sloan School of Management MIT OpenCourseWare Industry Mapping:	18	Applying the algorithms of clustering using python

		• Data mining and society		<i>Understand the clustering algorithms and implement in the industry data</i>		
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*Submitted by Sayan Karmakar, IEM, Saltlake campus

TEXTBOOK:

Introduction to data mining with Case studies by G. K. Gupta

[INTRODUCTION TO DATA MINING WITH CASE STUDIES - G. K. GUPTA - Google Books](#)

REFERENCE BOOK:

Data Mining: Concepts and Techniques by Han and Kamber

Case Studies

1. [Case studies of Data Mining](#)

Readings:

- Mohammed J. Zaki, Wagner Meira, Jr., Data Mining and Machine Learning: Fundamental Concepts and Algorithms, 2nd Edition, Cambridge University Press, March 2020. ISBN: 978-1108473989. [Online Book | Data Mining and Machine Learning](#)

Lesson Plan:

Module 1: Introduction to Data Mining: 3rd Year, Sec D (Faculty : Prof. Sayan Karmakar)

WORKING DAY	DAY	LESSON PLAN – DESCRIPTION
1	1	Data, Information and knowledge
2	2	Background of data mining
3	3	Knowledge discovery in databases
4	4	Objectives of data mining

5	5	Promises and challenges
6	6	Mining and other disciplines
7	7	Current state of data mining
8	8	WEKA machine learning tool

Module 1: Principles of data mining: 3rd Year, Sec D (Faculty : Prof. Sayan Karmakar)

WORKING DAY	DAY	LESSON PLAN – DESCRIPTION
1	1	Data mining process
2	2	Data mining approaches
3	3	Categories of data mining problem
4	4	Overview of data mining solutions
5	5	Evaluation of mining results
6	6	Data mining in WEKA
7	7	Review of basic concepts of probability and statistics
8	8	Summary

Module 2: Data, pre-processing and exploration: 3rd Year, Sec D (Faculty : Prof. Sayan Karmakar)

WORKING DAY	DAY	LESSON PLAN – DESCRIPTION
1	1	Input data and data types
2	2	Input datasets
3	3	Data sources
4	4	Data quality
5	5	Data pre-processing
6	6	Understanding data by exploration
7	7	Data pre-processing and visualizing in WEKA
8	8	Summary

Module 3: Mining Frequent Patterns, Associations, and Correlations: 3rd Year, Sec D (Faculty : Prof. Sayan Karmakar)

WORKING DAY	DAY	LESSON PLAN – DESCRIPTION
1	1	Problem description and decomposition
2	2	Finding all frequent itemsets: Apriori Algorithm
3	3	Generating association rules: Apriori Approach

4	4	Improving apriori approach
5	5	Evaluation of association rules
6	6	Association rules mining in practice

Module 4: Classification Basic Concepts: 3rd Year, Sec D (Faculty : Prof. Sayan Karmakar)

WORKING DAY	DAY	LESSON PLAN – DESCRIPTION
1	1	Decision tree and decision tree induction approach
2	2	The ID3 algorithm and information gain measure
3	3	Attribute selection measures in other decision tree methods
4	4	Solving the problem of overfitting
5	5	Evaluate the performance performance of a decision tree
6	6	Decision tree classification in WEKA
7	7	Presentation Class
8	8	Presentation Class
9	9	Presentation Class
10	10	Presentation Class
11	11	Presentation Class
12	12	Presentation Class

Module 5: Cluster Analysis and Outlier: 3rd Year,Sec D (Faculty : Prof. Sayan Karmakar)

WORKING DAY	DAY	LESSON PLAN – DESCRIPTION
1	1	Problem of cluster detection
2	2	Measure of proximity
3	3	K-means clustering method
4	4	Agglomeration clustering method
5	5	Clustering evaluation and validation
6	6	Clustering in WEKA

Module 1,2,3,4 : 2nd Year,Sec B (Faculty : Prof. Suchana Roy)

WORKING DAY	DAY	LESSON PLAN – DESCRIPTION
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1	1	Case study Class – Module 1
2	2	Case study Class – Module 2
3	3	Case study Class – Module 2
4	4	Case study Class – Module 3
5	5	Case study Class – Module 3
6	6	Case study Class – Module 4
7	7	Case study Class – Module 4
8	8	Case study – Module 5

TEXTBOOK:

[INTRODUCTION TO DATA MINING WITH CASE STUDIES - G. K. GUPTA - Google Books](#)

Reference Book:

1. Data mining techniques and applications – Hongbo Du by Cengage publications
2. Data Mining: Concepts and Techniques by Han and Kamber

QUESTION PAPER PATTERN AND DATES

EXAMINATION	Dates	PART – A	PART – B	PART – C	TOTAL MARKS
Mid Term 1	February 10, 2025 to February 21, 2025	Attempt 5 out of 10 questions; Each question carries 2 marks (2×5)	Attempt 2 out of 4 questions; Each question carries 5 marks (5×2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10×1)	30
Mid Term 2	March 24, 2025 to April 2, 2025	Attempt 5 out of 10 questions; Each question carries 2 marks (2×5)	Attempt 2 out of 4 questions; Each question carries 5 marks (5×2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10×1)	30
End Semester Examination	April 21, 2025 to May 9, 2025	Attempt 10 out of 15 questions; Each question carries 2 marks (2×10)	Attempt 6 out of 9 questions; Each question carries 5 marks (5×6)	Attempt 5 out of 8 questions; Each question carries 10 marks (10×5)	100

Examination Rules & Regulations:

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