School of Management
Details of Lesson Plan

S.No.	Particulars	Details
1.	Course Name	AI FOR BUSINESS MANAGERS
2.	Course Code	MBA-443
3.	Academic Year	2024-25
4.	Semester	MBA - 4th
5.	Number of Lesson plans	46
6.	Faculty Assigned	Ms. Deepanshi

Faculty Signature

Save Paper
Save Trees
Save the World

Version 1.1

श्रेष्ठ 🎓   श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

Lesson Plan No. 1	Course Name: AI for Business Managers **Topic:** Introduction to Artificial Intelligence: History and Evolution	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define Artificial Intelligence (AI) and differentiate it from related concepts. • Trace the historical development of AI, identifying key milestones and influential figures. • Understand the different approaches and paradigms in AI research. • Appreciate the current state of AI and its potential impact on business.
Teaching Aids (if any)	a. Interactive Projector b. Slides with timelines, images, and key concepts)

Teaching Development	1. **Introduction** (10 minutes)
	  - Start with a brainstorming session: Ask students to share their understanding of AI and provide examples of AI applications they have encountered.
	  - Briefly introduce the course and its objectives.
	  - Set the context by discussing the growing importance of AI in the business world.
	  Development (30 minutes)
	    a. **Defining AI** (10 minutes):
	      • Provide a formal definition of AI, emphasizing its focus on creating machines that can perform tasks that typically require human intelligence.
	      • Differentiate AI from related concepts like automation, robotics, and machine learning.
	      • Discuss the different types of AI: Narrow/Weak AI, General/Strong AI, and Super AI.
	    b. **History of AI** (10 minutes):
	      • Present a chronological overview of AI's history, highlighting key periods:
	      • Early Days (1950s-1970s): The Dartmouth Workshop, early AI programs (e.g., Logic Theorist, ELIZA), the emergence of symbolic AI.
	      • AI Winter (1970s-mid-1980s): Funding cuts, limitations of early AI systems.
	      • Expert Systems and the Rise of Machine Learning (mid-1980s-present): Development of expert systems, renewed interest in neural networks and statistical learning.

- **Deep Learning Revolution (2010s-present):** Breakthroughs in deep learning, increased availability of data and computing power.
- Introduce influential figures in AI history: Alan Turing, John McCarthy.

c. **Approaches to AI** (10 minutes):
- Discuss different approaches and paradigms in AI research:
- Symbolic AI (Rule-based systems): Emphasize the use of logic and symbolic representations.
- Connectionist AI (Neural networks): Focus on learning from data through interconnected networks of artificial neurons.
- Statistical AI (Machine learning): Utilize statistical methods to build predictive models from data.

2. **Exercise** (5 minutes) –
   - Divide students into small groups.
   - Assign each group a specific period in AI history or a particular AI approach.
   - Ask them to research and present a brief summary of their assigned topic to the class.

| **Closure** | 1. Summarize the key takeaways from the lesson, emphasizing the transformative evolution of AI, potential of AI and its current capabilities.
2. Briefly introduce the topics to be covered in the next lesson.
3. Encourage students to reflect on how AI might impact their future careers in business management.
4. Suggested Reading
   https://people.engr.tamu.edu/guni/csce421/files/AI_Russell_Norvig.p
   https://assets.cambridge.org/97805211/22931/frontmatter/9780521122931_frontmatter.pdf
5. Suggested video lecture
   -Introduction to Artificial Intelligence (AI)
   https://www.coursera.org/learn/introduction-to-ai
6. Homework
   - Research and write on the ethical implications of AI.
   - Find and summarize a recent research paper related to AI.

Spend 5 minutes to wrap up and consolidate the learnings |
| :--- | :--- |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. |

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————————————— Version 1.1

श्रेष्ठ 🎓   श्रम ⚙️ नवीनता 💡

Please Do Not Print Unless Necessary

2. Reflective questions can be:

- How does the definition of AI we discussed today differ from how AI is often portrayed in popular culture (movies, TV shows, etc.)? What are the potential consequences of these different portrayals?
- What are some of the most pressing ethical challenges posed by the increasing use of AI in business and society?
- Can you think of any examples from your own life or from current events that illustrate the impact of AI, both positive and negative?

Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 2	Course Name: AI for Business Managers Topic: AI Concepts, Terminology, and Application Areas	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define key AI concepts and terminology. • Understand and explain common AI terms such as algorithms, neural networks, and natural language processing. • Identify the various application areas of AI in business. • Evaluate the potential of AI technologies in transforming business processes.
Teaching Aids (if any)	a. Interactive Projector b. Slides with key concepts, AI terminology, and application case studies
Teaching Development	1. **Introduction** (10 minutes) - Begin with a brief recap of AI history and evolution. - Ask students to share examples of AI technologies they use or encounter in their daily lives. - Introduce the objectives of the lesson: understanding AI concepts, terminology, and application areas. - Discuss the relevance of understanding these concepts to business management. **Development** (30 minutes) a. **AI Concepts and Terminology** (10 minutes): • Define fundamental AI concepts such as algorithms, models, training, inference, and data. • Explain key terminology such as: - Artificial Intelligence: Creating machines that simulate human intelligence. - Machine Learning: A subset of AI where machines learn from data to improve performance. - Deep Learning: A class of machine learning algorithms inspired by the structure of the human brain. - Neural Networks: Computational models inspired by the human brain that are used for learning complex patterns. - Natural Language Processing (NLP): AI focused on enabling machines to understand and generate human language. - Computer Vision: AI enabling machines to interpret and make decisions based on visual data.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre

Version 1.1

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

	- Discuss how AI terminology and concepts interconnect with each other in real-world applications. **b. AI Application Areas in Business** (10 minutes): • Explore various AI applications in business, discussing the impact and current usage in different industries: • Customer Service: Chatbots, virtual assistants, sentiment analysis. • Marketing and Advertising: Personalized recommendations, predictive analytics, customer segmentation. • Operations and Supply Chain Management: Inventory optimization, demand forecasting, autonomous delivery systems. • Finance and Risk Management: Fraud detection, algorithmic trading, credit scoring. • Human Resources: Recruitment automation, employee performance analysis, AI-powered decision-making. • Present case studies or real-world examples where AI has been successfully integrated into business functions. • Discuss the challenges and potential benefits businesses might face when adopting AI. 2. **Exercise** (5 minutes) – - Divide students into small groups. - Assign each group a specific AI application area (e.g., customer service, finance, human resources). - Ask each group to discuss the potential of AI in their assigned area and present their findings to the class.
Closure	1. Summarize key takeaways from the lesson, focusing on the importance of understanding AI terminology and its applications across various industries. 2. Briefly introduce the topics to be covered in the next lesson. 3. Encourage students to reflect on how different AI applications might impact the way they approach business challenges. 4. **Suggested Reading** https://people.engr.tamu.edu/guni/csce421/files/AI_Russell_Norvig.p https://assets.cambridge.org/97805211/22931/frontmatter/9780521122931_frontmatter.pdf 5. Suggested video lecture - Introduction to AI Concepts and Terminology https://www.coursera.org/learn/introduction-to-ai 6. Homework - Research and write n one specific AI application in business, including challenges and potential benefits.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

	- Prepare a summary of a recent AI innovation and its impact on the industry. Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	
	2. Reflective questions can be:
	    ○ How do you think the AI concepts discussed today influence the development of business strategies?
	    ○ Which AI application area do you find most exciting and why?
	    ○ How might understanding AI terminology help you in making data-driven decisions in business management?
	Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 3	Course Name: AI for Business Managers	Course No.: MBA-443
	Topic: Artificial Intelligence: Issues	

Objectives	At the end of the lesson the student shall be able to: • Identify and analyze the key issues associated with Artificial Intelligence. • Discuss ethical, legal, and societal challenges related to AI implementation. • Evaluate the impact of AI on jobs, privacy, and decision-making processes in business. • Explore strategies for addressing AI-related issues in business contexts.
Teaching Aids (if any)	a. Interactive Projector b. Slides with issues, challenges, and case studies related to AI implementation.

Teaching Development	1. **Introduction** (10 minutes)
	  - Begin by asking students: What are some potential risks or challenges they think AI could pose in business and society?
	  - Introduce the lesson's objective: to understand the issues related to AI, including ethical concerns, impacts on jobs, privacy, and decision-making.
	  - Briefly recap key concepts from previous lessons to set the context for the discussion on issues related to AI.
	
	  Development (30 minutes)
	  a. **Ethical Issues in AI** (10 minutes):
	    • Discuss major ethical challenges related to AI, such as:
	    • Bias in AI: How AI models may perpetuate existing biases in data, leading to unfair outcomes.
	    • Transparency and Accountability: The challenge of explaining AI decision-making processes (the "black-box" problem).
	    • AI Autonomy and Control: Ethical concerns around AI making decisions without human intervention.
	    • Explore examples where AI has raised ethical questions (e.g., biased hiring algorithms, predictive policing, facial recognition technology).
	    • Encourage students to discuss potential ethical guidelines and regulatory frameworks for responsible AI use.
	  b. **Legal Issues in AI** (10 minutes):
	    • Discuss the legal implications of AI, such as:
	    • Intellectual Property: Who owns the AI-generated content, and who is responsible for its use?

Dr. Arun K. Gupta Teaching-Learning Centre ————————————— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ | श्रम | नवीनता

Please Do Not Print Unless Necessary

- Liability: Determining who is responsible for harm caused by AI systems (e.g., autonomous vehicles).
- Privacy Concerns: How AI can infringe on personal privacy through surveillance, data collection, and misuse of personal information.
- Provide examples of AI-related legal cases (e.g., GDPR compliance, AI in healthcare).
- Discuss the need for updated legal frameworks to address AI-specific challenges in business and society.

   c. **Impact on Jobs and Employment (10 minutes):**
    Examine how AI impacts jobs and employment:

- **Job Displacement**: How automation and AI may replace jobs, particularly in repetitive and routine tasks.
- **Job Creation**: How AI may create new types of jobs that require skills in technology, data analysis, and AI management.
- **Reskilling and Education**: The need for workers to learn new skills to adapt to the AI-driven workforce. Discuss how businesses can manage workforce changes due to AI implementation, including reskilling initiatives and workforce planning.

2. **Exercise** (5 minutes) –
   - Divide students into small groups.
   - Assign each group a specific AI issue (ethical, legal, or employment-related).
   - Ask each group to develop strategies for addressing their assigned issue, considering the business and societal implications. Each group will present their ideas to the class.

Closure	1. Summarize key takeaways from the lesson, emphasizing the importance of addressing AI-related issues proactively in business strategy. 2. Briefly introduce the next lesson's topics. 3. Encourage students to think critically about how AI-related issues will impact their future roles in business management. 4. **Suggested Reading** https://www.researchgate.net/publication/368449936_The_Ethical_Implications_of_Artificial_Intelligence_AI_For_Meaningful_Work 5. Suggested video lecture - Ethics and Legal Challenges of AI https://www.coursera.org/learn/ai-ethics 6. Homework

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ——————— Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

	- Research and write a report on the potential societal impacts of AI on privacy. - Investigate a recent legal case involving AI and summarize the outcomes. Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	
	2. Reflective questions can be:
	    ○ What ethical issues do you think businesses should prioritize when implementing AI?
	    ○ How can companies ensure their AI systems are transparent and accountable?
	    ○ How do you think AI will change the nature of work in the next decade?
	Spend 5 minutes to evaluate student assimilation of the lesson contents

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————— Version 1.1

श्रेष्ठ 🎓   श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

Lesson Plan No. 4	Course Name: AI for Business Managers **Topic:** Artificial Intelligence: Concerns and Ethical Considerations	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Understand the primary concerns and ethical considerations surrounding the implementation of AI. • Evaluate the societal, economic, and environmental impact of AI technologies. • Discuss responsible AI development and best practices for businesses. • Identify the role of businesses in addressing AI's ethical challenges.
Teaching Aids (if any)	a. Interactive Projector b. Slides with key concerns, ethical dilemmas, and case studies related to AI use in business.

Teaching Development	1. **Introduction** (10 minutes)
	    - Start by asking students to reflect on the ethical implications of AI in their daily lives or within their industries.
	    - Briefly review the topics covered in the previous lessons, particularly the issues and challenges of AI.
	    - Introduce the topic of the lesson: to understand and evaluate the ethical considerations and concerns involved in the deployment of AI technologies.
	    - Set the context by emphasizing the growing need for businesses to act responsibly in the age of AI.
	
	    Development (30 minutes)
	    a. **Ethical Concerns in AI** (10 minutes):
	        • Discuss major ethical challenges related to AI, such as:
	        • Discuss key ethical concerns in AI, such as:
	        • Bias and Fairness: The risk of AI systems reflecting human biases present in data, leading to unfair outcomes (e.g., biased hiring practices, lending decisions).
	        • Transparency and Explainability: The need for AI systems to be transparent and explainable, especially when used in high-stakes decision-making like healthcare or criminal justice.
	        • Accountability and Responsibility: Who should be held accountable when AI systems cause harm or make errors?

- Privacy and Data Protection: The ethical challenges of collecting, storing, and using large amounts of personal data by AI systems.
- Autonomy and Control: The implications of AI systems making autonomous decisions without human intervention, especially in critical areas like military or healthcare.
- Use real-world case studies to illustrate these concerns (e.g., bias in facial recognition systems, data privacy issues with AI-driven surveillance).

b. **Social and Environmental Impact** (10 minutes):
- Discuss the broader social and environmental impact of AI:
- Job Displacement: AI's potential to replace jobs, especially in low-skill and routine tasks, and how businesses can mitigate the negative impacts.
- Economic Inequality: The possibility of AI exacerbating inequality, with advanced technologies benefiting only a few companies or regions.
- Environmental Concerns: The significant energy consumption of AI systems, especially in training deep learning models, and its implications for sustainability.
- Discuss how businesses can address these concerns through responsible AI practices that promote societal good and environmental sustainability.

c. **Ethical Frameworks and Best Practices (10 minutes):**
Explore ethical frameworks for AI, including:
- **Utilitarianism**: Maximizing overall benefit while minimizing harm.
- **Deontological Ethics**: Following ethical principles and duties regardless of outcomes.
- **Virtue Ethics**: Focusing on the moral character of the individuals and organizations involved in AI development.
  Discuss best practices for businesses to follow when designing and implementing AI systems:
- **Inclusive Design**: Ensuring diverse teams and perspectives are involved in AI development to reduce biases.
- **Continuous Monitoring**: Regularly auditing AI systems for fairness, transparency, and unintended consequences.
- **Clear Accountability Structures**: Ensuring there is clarity regarding who is responsible for AI decisions and actions.

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ 🎓   श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

		Discuss the role of policymakers, business leaders, and technologists in shaping ethical AI standards
		2. **Exercise** (5 minutes) – - Divide students into small groups. - Assign each group a specific ethical concern related to AI (e.g., bias, privacy, accountability). - Ask each group to brainstorm solutions and strategies for businesses to address their assigned concern. Each group will present their ideas to the class.
Closure		1. Summarize the key points of the lesson, emphasizing the importance of addressing ethical concerns in AI development and deployment. 2. Briefly introduce the topics to be covered in the next lesson. 3. Encourage students to reflect on how businesses can integrate ethical considerations into their AI strategies.. 4. **Suggested Reading** https://www.researchgate.net/publication/368449936_The_Ethical_Implications_of_Artificial_Intelligence_AI_For_Meaningful_Work 5. Suggested video lecture - Ethical Challenges in AI Development and Deployment https://www.coursera.org/learn/ai-ethics 6. Homework - Research and write a report on one of the ethical concerns discussed in class, providing a detailed analysis of how businesses can address this concern. - Find and summarize a recent instance where a company faced an ethical dilemma related to AI. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation		1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Reflective questions can be: ○ What ethical issues do you think businesses need to prioritize when implementing AI technologies? ○ How can AI businesses ensure fairness in their algorithms? ○ How do you think ethical considerations in AI will evolve over the next few years? Spend 5 minutes to evaluate student assimilation of the lesson contents

Save Paper
Save Trees
Save the World
Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1
श्रेष्ठ   श्रम   नवीनता
Please Do Not Print Unless Necessary

Lesson Plan No. 5	Course Name: AI for Business Managers Topic: Artificial Intelligence: Concerns and Ethical Considerations	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Analyze the future trends and developments in Artificial Intelligence. • Understand the potential impact of emerging AI technologies on businesses and industries. • Discuss the opportunities and challenges posed by AI in the coming years. • Reflect on the ethical and societal implications of AI's future advancements.
Teaching Aids (if any)	a. Interactive Projector b. Slides with future AI trends, technologies, and potential business applications.

Teaching Development	1. **Introduction** (10 minutes)
	  - Begin by asking students: What do you think the future of AI holds in terms of business transformation?
	  - Briefly review previous lessons on the history, issues, and ethical considerations of AI.
	  - Introduce the lesson objectives: to explore the future trends, opportunities, and challenges of AI.
	  - Highlight the importance of understanding future AI trends in shaping business strategies and staying competitive.
	
	Development (30 minutes)
	  a. **Emerging Trends in AI** (10 minutes):
	    • Discuss the latest and upcoming trends in AI, including:
	    • AI in Automation: The increasing role of AI in automating complex tasks, from manufacturing to creative work (e.g., AI-driven design).
	    • AI-Driven Personalization: How AI will enable even more sophisticated personalization in marketing, customer service, and product development.
	    • Artificial General Intelligence (AGI): The potential development of AGI—machines that can perform any intellectual task a human can do.
	    • Explainable AI (XAI): The shift toward creating AI systems that are transparent and interpretable for users and businesses, improving trust and accountability.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ——————————— Version 1.1

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

- AI in Healthcare: Advanced AI applications in diagnostics, drug discovery, and personalized medicine.
- AI in Autonomous Systems: The future of autonomous vehicles, drones, and robotics powered by AI.

b. **Business Impact and Opportunities** (10 minutes):
- Discuss how AI will impact various industries in the future:
- Healthcare: AI-driven diagnostics, personalized treatment plans, robotic surgeries, and health monitoring systems.
- Finance: AI-powered fraud detection, algorithmic trading, and customer service automation.
- Retail: AI-driven inventory management, personalized shopping experiences, and AI assistants for customer engagement.
- Manufacturing: AI-powered predictive maintenance, smart factories, and supply chain optimization.
- Education: Personalized learning systems, AI tutors, and predictive analytics for student performance.
- Explore the new opportunities AI presents for businesses, such as improved efficiency, cost savings, and the creation of new products and services.
- Encourage students to consider how AI could reshape their industries and business models.

c. **Challenges and Risks in the Future of AI (10 minutes):**
Discuss potential challenges and risks businesses may face as AI evolves:
- Job Displacement: The ongoing concern over AI replacing human workers, particularly in routine and low-skill jobs.
- Ethical Concerns: New ethical dilemmas as AI becomes more autonomous and integrated into decision-making processes (e.g., in healthcare or the justice system).
- Security and Privacy: Increasing vulnerability to AI-driven cyber-attacks and concerns about data privacy as AI systems handle more sensitive information.
- Regulation and Governance: The need for updated laws and frameworks to govern AI technologies and their deployment across sectors.
- Discuss strategies businesses can adopt to address these challenges, including responsible AI practices, reskilling initiatives, and collaboration with policymakers.

Save Paper
Save Trees
Save the World
Dr. Arun K. Gupta Teaching-Learning Centre
Version 1.1
श्रेष्ठ श्रम नवीनता
Please Do Not Print Unless Necessary

	2. **Exercise** (5 minutes) – - Divide students into small groups. - Assign each group a specific industry (e.g., healthcare, finance, retail) and ask them to discuss the potential opportunities and risks AI could present in that sector over the next 5-10 years. - Each group will present their findings to the class, highlighting key business strategies to address these opportunities and challenges.
Closure	1. Summarize key takeaways from the lesson, emphasizing the exciting possibilities AI presents, as well as the challenges businesses will face. 2. Briefly introduce the topics to be covered in the next lesson. 3. Encourage students to think about the future role of AI in their own careers and how they can prepare to navigate and lead in an AI-driven business world. 4. **Suggested Reading** https://en.wikipedia.org/wiki/The_Second_Machine_Age 5. Suggested video lecture - The Future of AI and Its Impact on Business https://www.coursera.org/learn/ai-business 6. Homework - Research a recent breakthrough in AI and write a report on its potential future impact on business. - Prepare a brief reflection on how AI might change your industry in the next decade and how businesses can adapt. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Reflective questions can be: ○ What are some of the most exciting trends in AI that you think will shape the future of business? ○ How do you think businesses can leverage AI to gain a competitive advantage in the future? ○ What risks do you foresee with the widespread implementation of AI, and how can businesses mitigate them? Spend 5 minutes to evaluate student assimilation of the lesson contents

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————— Version 1.1

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

Lesson Plan No. 6	Course Name: AI for Business Managers **Topic:** Statistical Foundations of AI: Measures of Central Tendency - Mean	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define central tendency and explain its importance in statistical analysis for AI. • Calculate and interpret the mean of a data set. • Understand the role of the mean in data analysis for AI applications. • Differentiate between the mean and other measures of central tendency (median, mode). • Recognize how the mean is applied in AI, particularly in machine learning algorithms and predictive modeling.
Teaching Aids (if any)	a. Interactive Projector b. Slides with examples of data sets, formulas, and visual representations of mean. c. Calculator for calculating mean.

Teaching Development	1. **Introduction** (10 minutes)
	    - Begin with a real-world scenario: "Imagine you have a dataset of sales figures for the past year, and you need to make a decision on business strategy. How would you summarize the data?"
	    - Introduce the concept of central tendency as a method of summarizing data and explain its relevance in business decision-making, particularly for AI applications.
	    - Briefly introduce the lesson's focus on the mean and why it is a fundamental concept in data analysis.
	
	    Development (30 minutes)
	    a. **Defining Central Tendency and the Mean** (10 minutes):
	        • Define central tendency: The statistical measure used to identify a single value that describes the center of a data set.
	        • Introduce the mean as one of the primary measures of central tendency.
	        • Define mean: The sum of all values divided by the number of values.
	        • Show a simple example and walk through the calculation process.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

        b. Application of the Mean in AI (10 minutes):
- Explain how the mean is frequently used in AI, particularly in machine learning algorithms such as regression, clustering, and classification.
- Discuss the role of the mean in predictive modeling: For instance, calculating the mean to represent an average customer value or sales prediction.
- Relate the mean to data normalization and feature scaling in machine learning models.
- Show a real-world example of how the mean is used to analyze business data (e.g., calculating the average revenue per user or customer).

        c. Differentiating the Mean from Other Measures of Central Tendency (10 minutes):
- Define median and mode as alternative measures of central tendency.
- Compare and contrast the mean, median, and mode in terms of when each is more appropriate to use (e.g., mean for normally distributed data, median for skewed data, mode for categorical data).
- Provide examples to illustrate the differences and use cases of the mean, median, and mode.

2. **Exercise** (5 minutes) –
   - Divide students into small groups and give them a set of data.
   - Ask each group to calculate the mean, median, and mode of the data.
   - Have them discuss when each measure might be the most appropriate in different AI business applications (e.g., in sales analysis, customer feedback, or market trends).
   - Ask each group to present their results and reasoning.

Closure	1. Summarize the key takeaways: - The mean as a key measure of central tendency in data analysis. - The importance of the mean in AI, especially for predictive modeling and decision-making. - The relationship between the mean and other measures of central tendency. 2. Briefly introduce the next lesson on data variability and measures of spread (variance, standard deviation). 3. Encourage students to reflect on how understanding central tendency can help them analyze business data for AI-driven insights.

Save Paper
Save Trees
Save the World
Dr. Arun K. Gupta Teaching-Learning Centre —————— Version 1.1
श्रेष्ठ 🎓   श्रम ⚙️ नवीनता 💡
Please Do Not Print Unless Necessary

	4. **Suggested Reading** AI for Business Managers (chapter on data analysis techniques in machine learning). 5. Suggested video lecture - Introduction to Statistics for Machine Learning: https://www.coursera.org/learn/statistics-machine-learning 6. Homework - Research how central tendency (mean, median, and mode) is applied in AI algorithms like k-means clustering or linear regression. - Write a short report on the role of the mean in AI-based business analytics. Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	
	2. Reflective questions can be:
	   ○ How can businesses use the mean to improve customer experience or optimize operations?
	   ○ In what situations might the mean be misleading, and when would the median or mode be a better choice?
	   ○ What are some real-world examples where AI uses the mean to make decisions in business management?
	
	Spend 5 minutes to evaluate student assimilation of the lesson contents

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————— Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

Lesson Plan No. 7	Course Name: AI for Business Managers **Topic:** Statistical Foundations of AI: Median	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define the concept of median and explain its significance in statistical analysis for AI. • Calculate the median of a data set, distinguishing between even and odd numbers of data points. • Understand the role of the median in data analysis, especially in AI-related applications. • Differentiate between the mean, median, and mode, and recognize when to use each measure. • Apply the median in AI applications, particularly in situations where data distributions are skewed or have outliers.
Teaching Aids (if any)	a. Interactive Projector b. Slides with examples of data sets, step-by-step calculations, and visual representations of median. c. Calculator for calculating median.

Teaching Development	1. **Introduction** (10 minutes)
	- Start with a real-world scenario: "Imagine you are analyzing annual salaries of employees in a large company, and you want to determine the typical salary. What would you use to summarize this data: the mean or the median? Why?"
	- Introduce the concept of central tendency and explain why it is essential for AI data analysis.
	- Briefly explain that the lesson will focus on the median, its calculation, and how it differs from the mean.
	Development (30 minutes)
	  a. **Defining the median** (10 minutes):
	    • Define median: The middle value in a data set when the data points are ordered from least to greatest.
	    • Explain that if the number of data points is odd, the median is the middle number. If the number of data points is even, the median is the average of the two middle numbers.
	    • Walk through an example calculation of the median for both odd and even data sets. Walk through an example calculation of the mode with simple and multimodal data sets.
	  b. **Application of the Median in AI** (10 minutes):

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————— Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

	• Explain how the median is often preferred over the mean when analyzing skewed distributions or data with outliers (e.g., in income analysis or housing prices).
	 • Discuss the importance of the median in AI algorithms where it is critical to remove the influence of extreme outliers.
	 • Provide a business-related example where the median would be useful, such as analyzing customer purchase behavior in retail data.
	 • Discuss how the median is used in AI applications like regression models or robust clustering algorithms that require a more reliable central measure in the presence of noise or anomalies.
	
	 c. **Differentiating the Median from Other Measures of Central Tendency** (10 minutes):
	 • Recap the mean, median, and mode as the three main measures of central tendency.
	 • Compare and contrast their uses:
	 • Mean is sensitive to outliers, so it may not represent the central tendency in skewed data.
	 • Median is less affected by outliers and gives a better measure of central tendency in skewed data.
	 • Mode is useful for categorical data but not always applicable in continuous data.
	 • Provide visual examples (e.g., skewed income data) showing when the median is more appropriate than the mean.
	 • Engage the class in a discussion on when to use each measure based on data characteristics.
	
	 2. **Exercise** (5 minutes) –
	   - Divide students into small groups and provide them with a data set (e.g., household incomes, test scores, or product prices).
	   - Ask each group to calculate the median of the data and discuss how the presence of outliers might influence their choice of measure.
	   - Have each group present their findings and reasoning for choosing the median over other measures of central tendency in this context.

Closure	1. Summarize the key takeaways: a. The median as a robust measure of central tendency that is less influenced by outliers compared to the mean.

Dr. Arun K. Gupta Teaching-Learning Centre ———— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

	b. The importance of using the median in AI and business applications when data distributions are skewed or have extreme values. c. The relationship between the mean, median, and mode in selecting the most appropriate measure for summarizing data. 2. Briefly introduce the next lesson on **measures of data spread** (variance, standard deviation). 3. Encourage students to reflect on how understanding the mode can help them analyze business data and drive AI-based decision-making. 4. **Suggested Reading** AI for Business Managers (chapter on data analysis techniques in machine learning). 5. Suggested video lecture - Introduction to Statistics for Machine Learning: https://www.coursera.org/learn/statistics-machine-learning 6. Homework - Research how central tendency (mean, median, and mode) is applied in AI algorithms like k-means clustering or linear regression. - Write a short report on the role of the median in AI-based business analytics. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Reflective questions can be: ○ How can businesses use the median to make decisions in the presence of extreme outliers, such as in the case of property prices or executive salaries? ○ In what situations might the median be misleading, and how could other measures like the mean or mode provide more insight? ○ How does the median contribute to building more robust AI models, and what role does it play in data preprocessing? Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 8	Course Name: AI for Business Managers **Topic:** Statistical Foundations of AI: Mode	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define the concept of mode and explain its significance in statistical analysis for AI. • Calculate the mode of a data set, identifying situations with no mode, one mode, or multiple modes. • Understand the role of the mode in data analysis, especially in AI-related applications. • Differentiate between the mean, median, and mode, and recognize when to use each measure. • Apply the mode in AI applications, particularly in categorical data and decision-making processes.
Teaching Aids (if any)	a. Interactive Projector b. Slides with examples of data sets, step-by-step calculations, and visual representations of mode. c. Calculator or software for calculating median.

Teaching Development	1. **Introduction** (10 minutes)
	 - Start with a real-world scenario: "Imagine you're analyzing the most popular product in an online store based on customer purchase data. How would you determine the most popular item? What measure would be most useful: the mean, median, or mode? Why?"
	 - Introduce the concept of measures of central tendency (mean, median, and mode) and explain that today's focus will be on the mode and its importance in AI applications.
	 - Briefly explain that the mode is a measure of central tendency that represents the most frequent value in a data set.
	
	 Development (30 minutes)
	   a. **Defining the Mode** (10 minutes):
	     • Define mode: The mode is the value that appears most frequently in a data set. If no value repeats, there is no mode; if multiple values repeat with the same frequency, the data set is multimodal.
	     • Explain different scenarios:
	     • A data set with one mode (unimodal)
	     • A data set with no mode (no repeating values)
	     • A data set with multiple modes (bimodal or multimodal)

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————————————— Version 1.1

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

- Walk through an example calculation of the mode with simple and multimodal data sets.

b. **Application of the Mode in AI** (10 minutes):
- Explain how the mode is useful when analyzing categorical or discrete data, where the most frequent occurrence is of interest (e.g., determining the most popular category in a customer survey).
- Discuss the role of the mode in AI algorithms for clustering or classification, where identifying frequent patterns or features in a dataset can inform decision-making.
- Provide a business-related example, such as determining the most common customer complaints or the most frequently purchased products in retail data.
- Discuss how the mode is used in AI applications, like recommendation systems, where identifying popular items or trends is essential.

c. **Differentiating the Mode from Other Measures of Central Tendency** (10 minutes):
- Recap the differences between the mean, median, and mode.
- Compare and contrast their uses:
- Mean: Sensitive to outliers and provides a summary of the average.
- Median: Less affected by outliers and gives a central measure in skewed data.
- Mode: Useful for categorical or nominal data and shows the most frequent observation.
- Provide visual examples (e.g., product sales data) showing when the mode is more appropriate than the mean or median.
- Engage the class in a discussion on when to use each measure based on data characteristics.

2. **Exercise** (5 minutes) –
- Divide students into small groups and provide them with a data set (e.g., customer feedback ratings, product categories, or favorite colors).
- Ask each group to calculate the mode of the data and discuss why the mode is the most appropriate measure in this context.
- Have each group present their findings and reasoning for choosing the mode over other measures of central tendency.

Closure	1. Summarize the key takeaways:

	a. The mode is a measure of central tendency that represents the most frequent value in a data set.
	b. The importance of using the mode in AI and business applications, especially for categorical data.
	c. The relationship between the mean, median, and mode in selecting the most appropriate measure for summarizing data.
	2. Briefly introduce the next lesson on **measures of data spread** (variance, standard deviation).
	3. Encourage students to reflect on how understanding the mode can help them analyze business data and drive AI-based decision-making.
	4. **Suggested Reading** AI for Business Managers (chapter on data analysis techniques in machine learning).
	5. Suggested video lecture - Introduction to Statistics for Machine Learning: https://www.coursera.org/learn/statistics-machine-learning
	6. Homework
	- Research how the mode is applied in AI algorithms like clustering or classification.
	- Write a short report on the role of the mode in AI-based customer segmentation.
	Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Reflective questions can be: ○ How can businesses use the mode to identify trends or popular items in customer behavior, such as in a product inventory or survey data? ○ In what situations might the mode be misleading, and how could other measures like the mean or median provide more insight? ○ How does the mode contribute to building more effective AI models, especially in marketing or customer analysis? Spend 5 minutes to evaluate student assimilation of the lesson contents

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————————— Version 1.1

श्रेष्ठ 🎓   श्रम ⚙️ नवीनता 💡

Please Do Not Print Unless Necessary

Lesson Plan No. 9	Course Name: AI for Business Managers **Topic:** Statistical Foundations of AI: Correlation	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define the concept of mode and explain its significance in statistical analysis for AI. • Calculate the mode of a data set, identifying situations with no mode, one mode, or multiple modes. • Understand the role of the mode in data analysis, especially in AI-related applications. • Differentiate between the mean, median, and mode, and recognize when to use each measure. • Apply the mode in AI applications, particularly in categorical data and decision-making processes.
Teaching Aids (if any)	a. Interactive Projector b. Slides with examples of data sets, step-by-step calculations, and visual representations of mode. c. Calculator or software for calculating median.

Teaching Development	1. **Introduction** (10 minutes)
	- Start with a real-world scenario: "Imagine you're analyzing the most popular product in an online store based on customer purchase data. How would you determine the most popular item? What measure would be most useful: the mean, median, or mode? Why?"
	- Introduce the concept of measures of central tendency (mean, median, and mode) and explain that today's focus will be on the mode and its importance in AI applications.
	- Briefly explain that the mode is a measure of central tendency that represents the most frequent value in a data set.
	
	Development (30 minutes)
	  a. **Defining the Mode** (10 minutes):
	    • Define mode: The mode is the value that appears most frequently in a data set. If no value repeats, there is no mode; if multiple values repeat with the same frequency, the data set is multimodal.
	    • Explain different scenarios:
	    • A data set with one mode (unimodal)
	    • A data set with no mode (no repeating values)
	    • A data set with multiple modes (bimodal or multimodal)

- Walk through an example calculation of the mode with simple and multimodal data sets.

b. **Application of the Mode in AI** (10 minutes):
- Explain how the mode is useful when analyzing categorical or discrete data, where the most frequent occurrence is of interest (e.g., determining the most popular category in a customer survey).
- Discuss the role of the mode in AI algorithms for clustering or classification, where identifying frequent patterns or features in a dataset can inform decision-making.
- Provide a business-related example, such as determining the most common customer complaints or the most frequently purchased products in retail data.
- Discuss how the mode is used in AI applications, like recommendation systems, where identifying popular items or trends is essential.

c. **Differentiating the Mode from Other Measures of Central Tendency** (10 minutes):
- Recap the differences between the mean, median, and mode.
- Compare and contrast their uses:
- Mean: Sensitive to outliers and provides a summary of the average.
- Median: Less affected by outliers and gives a central measure in skewed data.
- Mode: Useful for categorical or nominal data and shows the most frequent observation.
- Provide visual examples (e.g., product sales data) showing when the mode is more appropriate than the mean or median.
- Engage the class in a discussion on when to use each measure based on data characteristics.

2. **Exercise** (5 minutes) –
- Divide students into small groups and provide them with a data set (e.g., customer feedback ratings, product categories, or favorite colors).
- Ask each group to calculate the mode of the data and discuss why the mode is the most appropriate measure in this context.
- Have each group present their findings and reasoning for choosing the mode over other measures of central tendency.

Closure	1. Summarize the key takeaways:

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————— Version 1.1

श्रेष्ठ 🎓   श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

	a. The mode is a measure of central tendency that represents the most frequent value in a data set.
	b. The importance of using the mode in AI and business applications, especially for categorical data.
	c. The relationship between the mean, median, and mode in selecting the most appropriate measure for summarizing data.
	2. Briefly introduce the next lesson on **measures of data spread** (variance, standard deviation).
	3. Encourage students to reflect on how understanding the mode can help them analyze business data and drive AI-based decision-making.
	4. **Suggested Reading** AI for Business Managers (chapter on data analysis techniques in machine learning).
	5. Suggested video lecture - Introduction to Statistics for Machine Learning: https://www.coursera.org/learn/statistics-machine-learning
	6. Homework
	- Research how the mode is applied in AI algorithms like clustering or classification.
	- Write a short report on the role of the mode in AI-based customer segmentation.
	Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	○ How can businesses use the mode to identify trends or popular items in customer behavior, such as in a product inventory or survey data?
	○ In what situations might the mode be misleading, and how could other measures like the mean or median provide more insight?
	○ How does the mode contribute to building more effective AI models, especially in marketing or customer analysis?
	Spend 5 minutes to evaluate student assimilation of the lesson contents

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————————— Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

Lesson Plan No. 10	Course Name: AI for Business Managers Topic: Regression Analysis	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define regression analysis and its importance in AI. • Understand simple linear regression and its equation • Calculate and interpret the slope and intercept of a regression line. • Differentiate between correlation and regression. • Apply regression to predict and analyze trends in real-world and AI scenarios.
Teaching Aids (if any)	a. Interactive Projector b. Slides with simple examples and graphs c. Calculator or software (Excel/Python).

Teaching Development	1. **Introduction** (10 minutes)
	   - Scenario: Present a real-world problem: "Imagine you're working for an e-commerce company and want to predict future sales based on advertising expenses. How would you create a predictive model to establish the relationship between these two variables?"
	   - Introduce the concept of regression analysis and its importance in understanding and predicting relationships between variables.
	   - Briefly explain simple linear regression: a statistical technique to model the relationship between one dependent variable (Y) and one independent variable (X).
	   - Highlight its significance in AI for tasks such as forecasting, trend analysis, and predictive modeling.
	
	Development (30 minutes)
	  a. **What is Regression?** (10 minutes):
	    • Define simple linear regression: a method to find the relationship between one dependent variable (Y) and one independent variable (X).
	    • Introduce the equation $Y = a + bX$
	    a: Intercept (Y when X = 0).
	    b: Slope (change in Y per unit of X).
	
	  b. **Example Calculation** (10 minutes):
	    • Provide a dataset (e.g., hours studied vs. exam scores).
	    • Step-by-step:
	    Calculate the slope
	    Formulate the regression equation.
	    • Predict a value of Y for a given X.

	c. **Applications in AI** (10 minutes):
	    • Use cases:
	      - Predicting sales, demand, or prices.
	      - Analyzing trends in customer data.
	    • Highlight the difference between correlation (strength of relationship) and regression (predicting the relationship).
	
	2. **Exercise** (5 minutes) –
	    • Provide a simple dataset (e.g., experience vs. salary).
	    • Ask students to:
	      - Plot a scatter plot.
	      - Calculate the regression equation.
	      - Predict Y for a given X.

Closure	1. Summarize the key takeaways:
	    a. Regression models relationships and predicts trends.
	    b. The slope and intercept provide key insights.
	    c. Applications in AI include forecasting and decision-making.
	2. Briefly introduce the next lesson on **measures of data spread** (variance, standard deviation).
	3. Encourage students to reflect on how understanding the mode can help them analyze business data and drive AI-based decision-making.
	4. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	5. Suggested video lecture
	- Introduction to Statistics for Machine Learning:
	https://www.coursera.org/learn/statistics-machine-learning
	6. Homework
	- Research a real-world use of regression in AI and write a short explanation.
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	
	2. Reflective questions can be:
	    ○ What is the role of regression in prediction?
	    ○ How is regression different from correlation?
	    ○ What are some limitations of simple regression?
	
	Spend 5 minutes to evaluate student assimilation of the lesson contents

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————————— Version 1.1

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

Lesson Plan No. 11	Course Name: AI for Business Managers	Course No.: MBA-
	Topic: Simple Linear Regression Model	**443**

Objectives	At the end of the lesson the student shall be able to: • Define the simple linear regression model and explain its components. • Understand and interpret the equation of a simple linear regression model • Understand the assumptions of simple linear regression. • Apply the model to predict outcomes and analyze trends in business and AI-related problems
Teaching Aids (if any)	a. Interactive Projector b. Slides with simple examples and graphs c. Calculator or software (Excel/Python).

Teaching Development	1. **Introduction** (10 minutes)
	   - Scenario: "Imagine you're managing a marketing team, and you want to estimate how much revenue will increase with every additional dollar spent on advertising. How can you model this relationship?"
	   - Introduce the concept of the Simple Linear Regression Model, a tool to establish a linear relationship between a dependent variable (Y) and an independent variable (X).
	   - Briefly explain how this model is foundational in AI for tasks like forecasting and predictive analytics.
	
	  Development (30 minutes)
	    a. **Definition and Equation** (10 minutes):
	      • Define simple linear regression: a method to find the relationship between one dependent variable (Y) and one independent variable (X).
	      • Introduce the equation $Y = a + bX$
	      a: Intercept (Y when X = 0).
	      b: Slope (change in Y per unit of X).
	    b. **Example Calculation** (10 minutes):
	      • Provide a dataset (e.g., hours studied vs. exam scores).
	      • Step-by-step:
	      Calculate the slope
	      Formulate the regression equation.
	      • Predict a value of Y for a given X.
	    c. **Applications in AI** (10 minutes):
	      • Use cases:
	        - Predicting future sales based on advertising expenses.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

	- Estimating house prices based on area or location.
	    Forecasting customer churn based on interaction metrics.
	    • Highlight how regression is applied in AI algorithms for predictive modeling.
	    • Compare the model's results with real-world scenarios to showcase practical relevance
	2. **Exercise** (5 minutes) –
	    • Provide a simple dataset (e.g., experience vs. salary).
	    • Ask students to:
	      - Plot a scatter plot.
	      - Calculate the regression equation.
	      - Predict Y for a given X.

Closure	1. Summarize the key takeaways:
	    a. Regression models relationships and predicts trends.
	    b. The slope and intercept provide key insights.
	    c. Applications in AI include forecasting and decision-making.
	2. Briefly introduce the next lesson on **measures of data spread** (variance, standard deviation).
	3. Encourage students to reflect on how understanding the mode can help them analyze business data and drive AI-based decision-making.
	4. **Suggested Reading**
	    AI for Business Managers (chapter on data analysis techniques in machine learning).
	5. Suggested video lecture
	    - Introduction to Statistics for Machine Learning:
	    https://www.coursera.org/learn/statistics-machine-learning
	6. Homework
	    - Research how regression is used in customer behavior prediction in e-commerce. Write a short report with examples.
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	    ○ How does the slope (bbb) help us understand the relationship between XXX and YYY?
	    ○ Why is it important to check the assumptions of regression?
	    ○ What are the limitations of the simple linear regression model?
	3. Discuss answers and consolidate the lesson.
	Spend 5 minutes to evaluate student assimilation of the lesson contents

Dr. Arun K. Gupta Teaching-Learning Centre   Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

Lesson Plan No. 12	Course Name: AI for Business Managers Topic: Regression Coefficients	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define regression coefficients and their significance in a regression model. • Understand the role of the slope • Calculate and interpret regression coefficients using a simple dataset. • Apply the understanding of regression coefficients to real-world business problems and AI scenarios.
Teaching Aids (if any)	a. Interactive Projector b. Slides with simple examples and graphs c. Calculator or software (Excel/Python).

Teaching Development	1. **Introduction** (10 minutes)
	  - Scenario: "You're working for a retail company and want to determine the impact of discounts on sales. How much of an increase in sales can you expect for every 1% increase in discounts? Let's explore how regression coefficients help answer this question."
	  - Briefly review the simple linear regression model ($Y=a+bX$) and its purpose.
	  - Highlight the importance of regression coefficients:
	  - Intercept (a): The predicted value of Y when $X=0$.
	  - Slope (b): The change in Y for a one-unit increase in X.
	
	  Development (30 minutes)
	    a. **Definition and Role of Regression Coefficients** (10 minutes):
	      • Define the coefficients:
	        Intercept (a): Starting value of the dependent variable Y.
	        Slope (b): Measures the strength and direction of the relationship between X and Y.
	      • Provide the formula for calculating coefficients:
	    b. **Example Calculation** (10 minutes):
	      • Provide a dataset (e.g., hours studied vs. exam scores).
	      • Step-by-step:
	        Calculate the slope
	        Formulate the regression equation.
	      • Predict a value of Y for a given X.
	    c. **Applications in AI** (10 minutes):
	      • Use cases:

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

	- Predicting future sales based on advertising expenses.
	- Estimating house prices based on area or location.
	Forecasting customer churn based on interaction metrics.
	• Highlight how regression is applied in AI algorithms for predictive modeling.
	• Compare the model's results with real-world scenarios to showcase practical relevance
	2. **Exercise** (5 minutes) –
	    • Provide a simple dataset (e.g., experience vs. salary).
	    • Ask students to:
	      - Calculate the slope and intercept using the given formulas.
	      - Formulate the regression equation.
	      -

Closure	1. Summarize the key takeaways:
	    a. Regression models relationships and predicts trends.
	    b. The slope and intercept provide key insights.
	    c. Applications in AI include forecasting and decision-making.
	2. Briefly introduce the next lesson on **measures of data spread** (variance, standard deviation).
	3. Encourage students to reflect on how understanding the mode can help them analyze business data and drive AI-based decision-making.
	4. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	5. Suggested video lecture
	- Introduction to Statistics for Machine Learning:
	https://www.coursera.org/learn/statistics-machine-learning
	6. Homework
	    - Research how regression is used in customer behavior prediction in e-commerce. Write a short report with examples.
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	    ○ How does the slope (b) help us understand the relationship between X and Y?
	    ○ Why is it important to understand the intercept a?
	    ○ What are the limitations of the simple linear regression model?
	3. Discuss answers and consolidate the lesson.
	Spend 5 minutes to evaluate student assimilation of the lesson contents

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

Dr. Arun K. Gupta Teaching-Learning Centre ———— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

Model Institute of Engineering
& Technology (Autonomous)
Lesson Plan

MIET
FUTURE BEGINS HERE....

Kot Bhalwal, Jammu

Lesson Plan No. 13	Course Name: AI for Business Managers **Topic:** Regression Equations	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define regression coefficients and their significance in a regression model. • Understand the role of the slope • Calculate and interpret regression coefficients using a simple dataset. • Apply the understanding of regression coefficients to real-world business problems and AI scenarios.
Teaching Aids (if any)	a. Interactive Projector b. Slides with simple examples and graphs c. Calculator or software (Excel/Python).

Teaching Development	1. **Introduction** (10 minutes)
	    - Scenario: "You're working for an online food delivery company and want to predict delivery time based on the distance traveled. How can you create a formula to make these predictions?"
	    - Introduce the concept of regression equations as mathematical models to describe the relationship between a dependent variable
	    - Highlight the importance of regression equations in AI for tasks like forecasting, trend analysis, and decision-making.
	   Development (30 minutes)
	     a. **Structure and Components of a Regression Equation** (10 minutes):
	       • Define the regression equation: $Y=a+bX$
	         - Y: Dependent variable (predicted value).
	         - X: Independent variable (input).
	         - a: Intercept (value of Y when $X=0$).
	         - b: Slope (change in Y for a unit change in X).
	       • Explain the relationship between the variables:
	         - The equation describes how Y changes based on X.
	         - a and b are derived from the data.
	     b. **Example Calculation** (10 minutes):
	       • Provide a simple dataset (e.g., distance vs. delivery time).
	       • Step-by-step:
	       Calculate the slope
	       Formulate the regression equation.
	       • Predict a value of Y for a given X.
	     c. **Applications of Regression Equations** (10 minutes):

	- Use cases: - Predicting sales based on advertising expenses. - Estimating fuel consumption based on vehicle speed. - Forecasting demand based on seasonality.. - Emphasize how regression equations are foundational for AI models in predicting outcomes and analyzing trends. 2. **Exercise** (5 minutes) – - Provide a simple dataset (e.g., experience vs. salary). - Ask students to: - Calculate the slope and intercept using the given formulas. - Formulate the regression equation.

Closure	1. Summarize the key takeaways:
	   a. Regression models relationships and predicts trends.
	   b. The slope and intercept provide key insights.
	   c. Applications in AI include forecasting and decision-making.
	2. Briefly introduce the next lesson on **measures of data spread** (variance, standard deviation).
	3. Encourage students to reflect on how understanding the mode can help them analyze business data and drive AI-based decision-making.
	4. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	5. Suggested video lecture
	- Introduction to Statistics for Machine Learning:
	https://www.coursera.org/learn/statistics-machine-learning
	6. Homework
	  - Research how regression is used in customer behavior prediction in e-commerce. Write a short report with examples.
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	  ○ How does the slope (b) help us understand the relationship between X and Y?
	  ○ Why is it important to understand the intercept a?
	  ○ What are the limitations of the simple linear regression model?
	3. Discuss answers and consolidate the lesson.
	Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 14	Course Name: AI for Business Managers **Topic:** Descriptive Statistics.	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define descriptive statistics and its importance in data analysis. • Differentiate between measures of central tendency (mean, median, mode) and measures of variability (range, variance, standard deviation). • Understand how descriptive statistics are applied in business and AI for summarizing and interpreting data.
Teaching Aids (if any)	a. Interactive Projector b. Slides with simple examples and graphs c. Calculator or software (Excel/Python).

Teaching Development	1. **Introduction** (10 minutes)
	    - Scenario: "Imagine you are managing a retail store and want to understand customer purchase patterns. You need to know the average purchase amount, how consistent the purchases are, and what trends are emerging from the data."
	    - Introduce descriptive statistics as tools to summarize and analyze data.
	    - Highlight its importance in:
	    Making business decisions.
	    Simplifying large datasets for analysis in AI and machine learning.
	    - Mention two key categories:
	    Measures of Central Tendency (Mean, Median, Mode).
	    Measures of Variability (Range, Variance, Standard Deviation).
	
	Development (30 minutes)
	  a. **Measures of Central Tendency** (10 minutes):
	    • Define and explain
	    • Discuss where each measure is applicable:
	    - Mean for overall trends.
	    - Median for skewed data (e.g., income distribution).
	    - Mode for the most common outcomes (e.g., product popularity).
	  b. **Measures of Variability** (10 minutes):
	    - Define and explain
	    - Range:
	      - Variance:
	    - Standard Deviation
	  c. **Applications in Business and AI** (10 minutes):
	    • Discuss real-life examples:

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre

Version 1.1

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

	Mean sales figures to set revenue targets. Median income to segment customers. Standard deviation to assess the risk in investment portfolios. - Highlight the role of descriptive statistics in AI: 2. **Exercise** (5 minutes) – - Present hypothetical business scenarios, such as: - Analyzing average sales for different product categories. - Determining the consistency of monthly revenue. - Ask students to: - Identify which measure (mean, median, mode, range, variance, SD) they would use and why. - Discuss their reasoning as a class.
Closure	1. Summarize the key takeaways: a. Regression models relationships and predicts trends. b. The slope and intercept provide key insights. c. Applications in AI include forecasting and decision-making. 2. Briefly introduce the next lesson on **measures of data spread** (variance, standard deviation). 3. Encourage students to reflect on how understanding the mode can help them analyze business data and drive AI-based decision-making. 4. **Suggested Reading** AI for Business Managers (chapter on data analysis techniques in machine learning). 5. Suggested video lecture - Introduction to Statistics for Machine Learning: https://www.coursera.org/learn/statistics-machine-learning 6. Homework - Write a short note on how understanding variability (e.g., standard deviation) can help manage business risks. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Reflective questions can be: - How would you use the mean and standard deviation to assess product performance? - Why is the median more appropriate than the mean in some cases? - Can you think of a business situation where variability is more important than the average? 3. Discuss answers and consolidate the lesson. Spend 5 minutes to evaluate student assimilation of the lesson contents

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ————————— Version 1.1

श्रेष्ठ 🎓   श्रम ⚙️ नवीनता 💡

Please Do Not Print Unless Necessary

Lesson Plan No. 16	Course Name: AI for Business Managers	Course No.: MBA-
	Topic: Supervised Learning	443

Objectives	At the end of the lesson the student shall be able to: • Define supervised learning. • Understand its components: features, labels, and training data. • Differentiate between classification and regression. • Explain the basic working of supervised learning algorithms.
Teaching Aids (if any)	a. Interactive Projector b. Slides with simple examples and graphs c. Calculator or software (Excel/Python).

Teaching Development	1. **Introduction** (10 minutes)
	     - Define supervised learning: A machine learning technique that uses labeled data for training a model.
	     - Highlight its purpose: To predict outputs based on input data.
	     - Mention its two main types: Classification and Regression.
	 Development (30 minutes)
	   a. Components of Supervised Learning (10 minutes):
	     • Features: Inputs or independent variables.
	     • Labels: Outputs or dependent variables.
	     • Training Data: Dataset with both features and labels.
	   b. Types of Supervised Learning (10 minutes):
	     • Classification:
	     Predicts discrete categories (e.g., Yes/No).
	     • Regression:
	     Predicts continuous values (e.g., numbers).
	   c. Steps in Supervised Learning (10 minutes):
	     • Collect labeled data (features and labels).
	     • Split data into training and testing sets.
	     • Train the model using the training data.
	     • Test the model using the testing data.
	     • Evaluate accuracy and make predictions.
	 2. **Exercise** (5 minutes) –
	     - Write the key components of supervised learning (features, labels, and training data) with simple examples of each.

Closure	1. Summarize the key takeaways:
	   a. Supervised learning predicts outcomes using labeled data.
	   b. Classification is for categories, and regression is for numbers.
	 2. Briefly introduce the next topic

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre

Version 1.1

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

	3. Encourage students to reflect on how understanding the mode can help them analyze business data and drive AI-based decision-making. 4. **Suggested Reading** AI for Business Managers (chapter on data analysis techniques in machine learning). 5. Suggested video lecture - Introduction to Statistics for Machine Learning: https://www.coursera.org/learn/statistics-machine-learning 6. Homework - Write a short explanation of classification and regression. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Reflective questions can be: ○ What are features and labels? ○ What are the two main types of supervised learning? 3. Discuss answers and consolidate the lesson. Spend 5 minutes to evaluate student assimilation of the lesson contents

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————— Version 1.1

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

Model Institute of Engineering
& Technology (Autonomous)
Lesson Plan

MIET
FUTURE BEGINS HERE....

Kot Bhalwal, Jammu

Lesson Plan No. 16	Course Name: AI for Business Managers Topic: Supervised Learning	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define supervised learning. • Understand its components: features, labels, and training data. • Differentiate between classification and regression. • Explain the basic working of supervised learning algorithms.
Teaching Aids (if any)	a. Interactive Projector b. Slides with simple examples and graphs c. Calculator or software (Excel/Python).
Teaching Development	1. **Introduction** (10 minutes) 　　- Define supervised learning: A machine learning technique that uses labeled data for training a model. 　　- Highlight its purpose: To predict outputs based on input data. 　　- Mention its two main types: Classification and Regression. 　**Development** (30 minutes) 　　a. **Components of Supervised Learning** (10 minutes): 　　　• Features: Inputs or independent variables. 　　　• Labels: Outputs or dependent variables. 　　　• Training Data: Dataset with both features and labels. 　　b. **Types of Supervised Learning** (10 minutes): 　　　• Classification: 　　　Predicts discrete categories (e.g., Yes/No). 　　　• Regression: 　　　Predicts continuous values (e.g., numbers). 　　c. **Steps in Supervised Learning** (10 minutes): 　　　• Collect labeled data (features and labels). 　　　• Split data into training and testing sets. 　　　• Train the model using the training data. 　　　• Test the model using the testing data. 　　　• Evaluate accuracy and make predictions. 2. **Exercise** (5 minutes) – 　　- Write the key components of supervised learning (features, labels, and training data) with simple examples of each.
Closure	1. Summarize the key takeaways: 　a. Supervised learning predicts outcomes using labeled data. 　b. Classification is for categories, and regression is for numbers. 2. Briefly introduce the next topic

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

श्रेष्ठ 🎓   श्रम ⚙️ नवीनता 💡

Please Do Not Print Unless Necessary

	3. Encourage students to reflect on how understanding the mode can help them analyze business data and drive AI-based decision-making.
	4. **Suggested Reading** AI for Business Managers (chapter on data analysis techniques in machine learning).
	5. Suggested video lecture - Introduction to Statistics for Machine Learning: https://www.coursera.org/learn/statistics-machine-learning
	6. Homework - Write a short explanation of classification and regression. Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	 2. Reflective questions can be:
	     ○ What are features and labels?
	     ○ What are the two main types of supervised learning?
	 3. Discuss answers and consolidate the lesson.
	
	 Spend 5 minutes to evaluate student assimilation of the lesson contents

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ——————————— Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

Model Institute of Engineering
& Technology (Autonomous)
Lesson Plan

MIET
FUTURE BEGINS HERE....

Kot Bhalwal, Jammu

Lesson Plan No. 17	Course Name: AI for Business Managers	Course No.: MBA-443
	Topic: Introduction to classification	

Objectives	At the end of the lesson the student shall be able to: • Define classification in machine learning. • Understand the basic concept of classifying data into different categories. • Differentiate between binary and multi-class classification. • Identify common algorithms used for classification tasks.
Teaching Aids (if any)	a. Interactive Projector b. Slides with simple examples and graphs c. Calculator or software (Excel/Python).

Teaching Development	1. **Introduction** (10 minutes)
	   - Define classification: A type of supervised learning where the model is trained to assign input data into predefined categories.
	   - Emphasize its purpose: Classification helps in predicting labels or categories for new data based on past data.
	   - Introduce the concept of labels: The predefined categories that the model will predict.
	Development (30 minutes)
	  a. **Types of Classification** (10 minutes):
	    • Binary Classification: Classifying data into two categories (e.g., spam or not spam).
	    • Multi-class Classification: Classifying data into more than two categories (e.g., classifying animals as dog, cat, or bird).
	  b. **How Classification Works** (10 minutes):
	    • The model is trained on labeled data (features and their corresponding labels).
	    • The algorithm learns to identify patterns in the features that correspond to each label.
	    • After training, the model can predict the label for new, unseen data based on the learned patterns.
	  c. **Common Classification Algorithms** (10 minutes):
	    • Logistic Regression: Used for binary classification.
	    • Decision Trees: Used for both binary and multi-class classification.
	    • K-Nearest Neighbors (KNN): Assigns data to the category of the majority of its nearest neighbors.
	    • Naive Bayes: Based on applying Bayes' theorem with strong (naive) independence assumptions.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————————— Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

	2. **Exercise** (5 minutes) – - Write down an example of binary and multi-class classification with simple features and labels.

Closure	1. Summarize the key takeaways:
	    a. Classification is used to categorize data into labels.
	    b. There are binary and multi-class classification tasks.
	    c. Common algorithms include Logistic Regression, Decision Trees, and KNN..
	 2. Briefly introduce the next topic
	 3. Encourage students to reflect on how understanding the mode can help them analyze business data and drive AI-based decision-making.
	 4. **Suggested Reading**
	 AI for Business Managers (chapter on data analysis techniques in machine learning).
	 5. Suggested video lecture
	 - Introduction to Statistics for Machine Learning:
	 https://www.coursera.org/learn/statistics-machine-learning
	 6. Homework
	 - Write a brief explanation of one classification algorithm and its application.
	
	 Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	 2. Reflective questions can be:
	    o What is the difference between binary and multi-class classification?
	    o Name one classification algorithm and explain its purpose.
	 3. Discuss answers and consolidate the lesson.
	
	 Spend 5 minutes to evaluate student assimilation of the lesson contents

Dr. Arun K. Gupta Teaching-Learning Centre ———————————— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

Lesson Plan No. 18	Course Name: AI for Business Managers Topic: Applications of supervised learning in multiple domains	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Understand the wide-ranging applications of supervised learning in various fields. • Identify real-world domains where supervised learning is applied. • Discuss how supervised learning algorithms are tailored for different industry needs.
Teaching Aids (if any)	a. Interactive Projector b. Slides with simple examples and graphs c. Calculator or software (Excel/Python).

Teaching Development	1. **Introduction** (10 minutes)
	    - Define supervised learning and its relevance in machine learning.
	    - Mention that supervised learning is used to predict outcomes based on labeled data in various domains like healthcare, finance, marketing, etc.
	    - Highlight how supervised learning models are trained using data with known outcomes to make predictions.
	  Development (30 minutes)
	    a. **Healthcare** (10 minutes):
	      • Explain how supervised learning is used for disease diagnosis (e.g., predicting whether a tumor is malignant or benign).
	      • Discuss predictive modeling for patient outcomes, such as predicting the likelihood of readmission or survival rates based on historical data.
	    b. **Finance** (10 minutes):
	      • Discuss applications in credit scoring, where supervised learning algorithms predict whether a person will default on a loan based on financial history.
	      • Mention fraud detection, where models are trained to detect abnormal transaction patterns and flag potential fraud.
	    c. **Marketing** (10 minutes):
	      • Explain customer segmentation, where supervised learning is used to categorize customers based on their purchasing behavior and preferences.
	      • Talk about predictive analytics for sales forecasting—predicting future sales based on historical sales data.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ——————————— Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

	2. **Exercise** (5 minutes) –
	  - Provide a list of industries (e.g., healthcare, finance, marketing).
	  - Ask students to identify a specific supervised learning application in each domain and describe its purpose.

Closure	1. Summarize the key takeaways:
	  a. Supervised learning has diverse applications across healthcare, finance, marketing, and more.
	  b. These applications help businesses make informed predictions and decisions.
	2. Briefly introduce the next topic
	3. **Suggested Reading**
	   AI for Business Managers (chapter on data analysis techniques in machine learning).
	4. Suggested video lecture
	   - Introduction to Statistics for Machine Learning: https://www.coursera.org/learn/statistics-machine-learning
	5. Homework
	  - Choose one domain (e.g., healthcare) and research a recent application of supervised learning in that domain. Write a short summary.
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	  ○ How is supervised learning used in healthcare?
	  ○ Can you think of other domains where supervised learning could be applied?
	3. Discuss answers and consolidate the lesson.
	
	Spend 5 minutes to evaluate student assimilation of the lesson contents

Dr. Arun K. Gupta Teaching-Learning Centre — Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

Lesson Plan No. 19	Course Name: AI for Business Managers **Topic:** Application of Supervised Learning in Solving Business Problems	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Understand how supervised learning can address business challenges. • Identify key business problems that can be solved using supervised learning techniques. • Apply supervised learning algorithms to predict business outcomes and improve decision-making.
Teaching Aids (if any)	a. Interactive Projector b. Slides with examples of business problems and solutions using supervised learning.

Teaching Development	1. **Introduction** (10 minutes)
	  - Introduce the concept of business problems that require predictive analytics and decision-making support.
	  - Explain that supervised learning is often used in business to predict future outcomes based on historical data.
	  - Mention how these predictions can be used to optimize business operations and strategies.
	 Development (30 minutes)
	  a. **Customer Behavior Prediction** (10 minutes):
	    • Discuss how supervised learning is used to predict customer behavior, such as churn prediction (whether a customer will leave or stay with the company).
	    • Explain how supervised learning models analyze customer data (e.g., purchase history, interaction) to predict future actions, enabling businesses to take proactive measures.
	  b. **Sales Forecasting** (10 minutes):
	    • Explain how businesses use supervised learning for sales forecasting, where models predict future sales based on historical sales data, trends, and market conditions.
	    • Highlight its importance for inventory management, staffing, and resource allocation.
	  c. **Fraud Detection** (10 minutes):
	    • Discuss how supervised learning is used in fraud detection within industries like finance and e-commerce.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre

Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

	• Explain how historical transaction data is used to train models to detect suspicious activity and prevent fraud, improving business security and trust. 2. **Exercise** (5 minutes) – - Provide a hypothetical business problem (e.g., predicting customer churn or sales forecasting). - Ask students to identify which supervised learning algorithm would be most suitable for solving the problem and why.
Closure	1. Summarize the key takeaways: a. Supervised learning is powerful in solving business problems such as predicting customer behavior, sales forecasting, and fraud detection. b. By analyzing historical data, businesses can make data-driven decisions that improve efficiency and profitability. Briefly introduce the next topic 2. **Suggested Reading** AI for Business Managers (chapter on data analysis techniques in machine learning). 3. Suggested video lecture - Introduction to Statistics for Machine Learning: https://www.coursera.org/learn/statistics-machine-learning 4. Homework - Research a business problem in your industry and explain how supervised learning could be applied to solve it. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Reflective questions can be: ○ How can businesses use supervised learning to predict customer churn? ○ Why is supervised learning essential for sales forecasting? Discuss answers and consolidate the lesson. Discuss answers and reinforce the concept of predictive analytics in business problem-solving.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

श्रेष्ठ 🎓   श्रम ⚙   नवीनता 💡

Please Do Not Print Unless Necessary

Lesson Plan No. 20	Course Name: AI for Business Managers **Topic:** Application of Supervised Learning in Solving Business Problems (Pricing)	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Understand how supervised learning can be applied to pricing problems in business. • Identify pricing challenges that can be addressed using supervised learning techniques. • Apply supervised learning to optimize pricing strategies and predict market outcomes.
Teaching Aids (if any)	a. Interactive Projector b. Slides with examples of business problems and solutions using supervised learning.

Teaching Development	1. **Introduction** (10 minutes)
	    - Introduce the concept of pricing problems in business, such as setting the right price for products and services to maximize revenue and market competitiveness.
	    - Discuss how pricing strategies are critical for business success and how supervised learning can help businesses determine the optimal price point.
	    - Explain that supervised learning models use historical pricing and sales data to predict the price that maximizes business outcomes.
	
	Development (30 minutes)
	   a. **Pricing Optimization** (10 minutes):
	     • Explain how businesses use supervised learning for dynamic pricing, where models adjust prices in real time based on factors such as demand, competitor pricing, and customer behavior.
	     • Provide an example: A retail company uses supervised learning to predict the ideal price for a product based on historical data and market conditions, aiming to maximize sales and profit margins.
	   b. **Predicting Price Sensitivity** (10 minutes):
	     • Discuss how supervised learning helps businesses understand price sensitivity by analyzing how customers respond to price changes.
	     • Explain how models can be trained using data from previous price changes and sales volume to predict how a price increase or decrease will affect customer demand.
	   c. **Market Segmentation and Pricing** (10 minutes):

Dr. Arun K. Gupta Teaching-Learning Centre ———————————— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

	- Explain how supervised learning is used in market segmentation to set personalized prices for different customer groups. - Example: Businesses can use supervised learning to identify customer segments (e.g., price-sensitive vs. premium customers) and create targeted pricing strategies for each segment. 2. **Exercise** (5 minutes) – - Provide a simple scenario where a business needs to determine the optimal price for a new product based on demand data and competitor pricing. - Ask students to suggest how they would apply supervised learning to predict the ideal price and justify their choice.

Closure	1. Summarize the key takeaways:
	   a. Supervised learning can significantly improve pricing strategies by optimizing prices, predicting customer price sensitivity, and personalizing pricing based on market segments.
	   b. These applications help businesses remain competitive, maximize revenue, and understand market dynamics better.
	2. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	- Introduction to Statistics for Machine Learning:
	https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	  - Research a business problem in your industry and explain how supervised learning could be applied to solve it.
	
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	   ○ How can supervised learning help a business optimize its pricing strategy?
	   ○ In what ways can supervised learning be used to understand customer price sensitivity?
	
	Discuss answers and reinforce the concept of predictive analytics in business problem-solving.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————— Version 1.1

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

Lesson Plan No. 21	Course Name: AI for Business Managers **Topic:** Application of Supervised Learning in Solving Business Problems (Customer Relationship Management)	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Understand how supervised learning can be applied to Customer Relationship Management (CRM). • Identify how supervised learning models improve customer segmentation and personalization in CRM. • Apply supervised learning techniques to predict customer behavior and improve customer retention and satisfaction.
Teaching Aids (if any)	a. Interactive Projector b. Slides with examples of CRM models using supervised learning.

Teaching Development	1. **Introduction** (10 minutes)
	  - Introduce the concept of Customer Relationship Management (CRM) and its importance in modern businesses.
	  - Discuss how businesses use CRM to manage interactions with customers, improve customer satisfaction, and foster loyalty.
	  - Explain how supervised learning can enhance CRM by predicting customer behavior, segmenting customers, and personalizing marketing efforts.
	Development (30 minutes)
	  a. **Customer Segmentation** (10 minutes):
	    • Explain how supervised learning is used for customer segmentation, where businesses can group customers based on similar characteristics (e.g., buying habits, demographics, or engagement level).
	    • Example: A company uses supervised learning to segment customers into groups like frequent buyers, occasional buyers, or high-value customers, which allows for tailored marketing campaigns.
	  b. **Predicting Customer Churn** (10 minutes):
	    • Discuss how supervised learning is applied to predict customer churn, identifying customers who are likely to stop purchasing or leave a service.
	    • Example: A telecom company uses supervised learning to analyze historical customer data (e.g., usage patterns, complaints, or service disruptions) to predict which customers are at high risk of canceling their subscriptions.

Save Paper
Save Trees
Save the World
Dr. Arun K. Gupta Teaching-Learning Centre
Version 1.1
श्रेष्ठ श्रम नवीनता
Please Do Not Print Unless Necessary

	c. Personalization and Targeted Marketing (10 minutes):
	    • Explain how businesses use supervised learning for personalized marketing, where the model predicts the most relevant products or services for individual customers.
	    • Example: An e-commerce company uses supervised learning to recommend products to customers based on their past purchases, browsing behavior, and preferences.
	2. **Exercise** (5 minutes) –
	    - Provide a dataset (e.g., customer demographic and purchase data).
	    - Ask students to suggest how they would use supervised learning to:
	        ○ Segment customers into groups.
	        ○ Predict which customers are likely to churn.
	        ○ Design personalized marketing offers based on the predicted customer behavior.

Closure	1. Summarize the key takeaways:
	    a. Supervised learning can significantly improve CRM by helping businesses segment customers, predict churn, and personalize marketing efforts to enhance customer retention and satisfaction.
	2. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	- Introduction to Statistics for Machine Learning:
	https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	    - Research a business problem in your industry and explain how supervised learning could be applied to solve it.
	
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	    ○ How does supervised learning help businesses segment customers effectively?
	    ○ In what ways can businesses predict customer churn using supervised learning?
	    ○ How can personalization through supervised learning improve customer satisfaction and retention?
	
	Discuss answers and reinforce the concept of predictive analytics in business problem-solving.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

श्रेष्ठ🎓 श्रम⚙️ नवीनता💡

Please Do Not Print Unless Necessary

Lesson Plan No. 22	Course Name: AI for Business Managers **Topic:** Application of Supervised Learning in Solving Business Problems Sales and Marketing.	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Understand the role of supervised learning in sales and marketing. • Identify how supervised learning can be applied for lead generation, sales forecasting, and targeted marketing. • Apply supervised learning techniques to optimize sales strategies and marketing efforts.
Teaching Aids (if any)	a. Interactive Projector b. Slides with examples of supervised learning models used in sales and marketing.

Teaching Development	1. **Introduction** (10 minutes)
	      - Introduce the role of sales and marketing in business operations, focusing on how businesses work to increase sales and improve customer outreach.
	      - Discuss how supervised learning can help optimize sales strategies and marketing campaigns by predicting customer behavior and trends.
	      - Explain that supervised learning can be applied to real-world sales and marketing problems such as lead scoring, sales forecasting, and personalized marketing campaigns.
	
	 Development (30 minutes)
	    a. **Lead Generation and Scoring** (10 minutes):
	      • Discuss how supervised learning can be used for lead scoring to identify high-potential customers.
	      • Example: A company uses customer data (e.g., website visits, engagement with emails, purchase history) to predict which leads are more likely to convert into paying customers.
	      • Explain the use of classification models (e.g., logistic regression, decision trees) to classify leads as "hot," "warm," or "cold."
	    b. **Sales Forecasting** (10 minutes):
	      • Explain how supervised learning is applied for sales forecasting, predicting future sales based on historical data such as past sales, seasonality, and promotional activity.
	      • Example: A retailer uses supervised learning to predict next quarter's sales based on trends from previous quarters, economic factors, and customer behavior.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————— Version 1.1

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

	- Highlight the use of regression models for continuous prediction of sales numbers. **c. Targeted Marketing Campaigns** (10 minutes): - Describe how businesses can apply supervised learning to create personalized marketing campaigns. - Example: An online retailer uses supervised learning to predict which products are most likely to interest individual customers based on their browsing and purchase history. 2. **Exercise** (5 minutes) – - Provide a dataset (e.g., customer engagement data, product preferences). - Ask students to: Identify how supervised learning could be applied to score leads. Suggest how sales forecasting could be done based on the dataset. Propose a targeted marketing campaign strategy based on customer segmentation.
Closure	1. Summarize the key takeaways: a. Supervised learning models can optimize sales and marketing efforts by improving lead scoring, predicting sales, and personalizing marketing campaigns to maximize impact. 2. **Suggested Reading** AI for Business Managers (chapter on data analysis techniques in machine learning). 3. Suggested video lecture - Introduction to Statistics for Machine Learning: https://www.coursera.org/learn/statistics-machine-learning 4. Homework - Research a business case where supervised learning was applied in sales and marketing to improve results. Write a short report on the implementation and outcomes. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Reflective questions can be: - How does supervised learning help businesses prioritize sales leads more effectively? - In what ways can supervised learning improve sales forecasting accuracy? - How can personalized marketing campaigns benefit from supervised learning in sales and marketing? Discuss answers and reinforce the concept of predictive analytics in business problem-solving.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————————— Version 1.1

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

Lesson Plan No. 23	Course Name: AI for Business Managers **Topic:** Unsupervised Learning - Concept	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define unsupervised learning and explain its key concepts. • Understand the difference between supervised and unsupervised learning. • Identify various applications of unsupervised learning in business. • Recognize the importance of clustering and dimensionality reduction in unsupervised learning.
Teaching Aids (if any)	a. Interactive Projector b. Slides with examples of unsupervised learning models.

Teaching Development	1. **Introduction** (10 minutes)
	    - Introduce the concept of unsupervised learning as a type of machine learning where the model is not provided with labeled data.
	    - Explain the importance of unsupervised learning in discovering hidden patterns and structures in data without prior knowledge of outcomes.
	    - Highlight that, in contrast to supervised learning, unsupervised learning works with data that lacks labeled responses or categories.
	Development (30 minutes)
	  a. **What is Unsupervised Learning?** (10 minutes):
	    • Define unsupervised learning: A machine learning technique where the algorithm learns patterns from data without explicit labels.
	    • Discuss the key objectives of unsupervised learning: to find structure, relationships, or groupings within data.
	    • Explain how unsupervised learning is used for tasks like clustering, anomaly detection, and dimensionality reduction.
	  b. **Key Concepts and Techniques** (10 minutes):
	    • Discuss common techniques used in unsupervised learning:
	      ○ Clustering: Grouping similar data points together (e.g., K-means clustering, hierarchical clustering).
	      ○ Dimensionality Reduction: Reducing the number of features in data while retaining important information (e.g., Principal Component Analysis - PCA).
	    • Use visual examples to explain how these techniques work with data.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————————— Version 1.1

श्रेष्ठ 🎓   श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

	c. **Applications of Unsupervised Learning in Business** (10 minutes): - Discuss various business applications of unsupervised learning: - Customer Segmentation: Grouping customers based on purchasing behavior or preferences. - Market Basket Analysis: Identifying product associations for cross-selling. - Anomaly Detection: Detecting outliers or fraudulent transactions in business data. - Dimensionality Reduction for Data Visualization: Reducing complexity in data for easier analysis or visualization. 2. **Exercise** (5 minutes) – - Provide a simple dataset (e.g., customer purchasing behavior). - Ask students to: Apply a clustering technique to group customers based on their behavior. Discuss the benefits of using unsupervised learning in this scenario.
Closure	1. Summarize the key takeaways: a. Unsupervised learning is essential for uncovering hidden patterns in data and for tasks where labeled data is not available. b. Clustering and dimensionality reduction are two fundamental techniques used in unsupervised learning. 2. **Suggested Reading** AI for Business Managers (chapter on data analysis techniques in machine learning). 3. Suggested video lecture - Introduction to Statistics for Machine Learning: https://www.coursera.org/learn/statistics-machine-learning 4. Homework - Research an application of unsupervised learning in business (e.g., customer segmentation or fraud detection) and write a report on how it has benefited the business. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Reflective questions can be: - How does unsupervised learning differ from supervised learning? - What are the key applications of unsupervised learning in business? - How can clustering and dimensionality reduction help businesses improve their operations?

	3. Discuss answers and reinforce the concept of predictive analytics in business problem-solving.

| Lesson Plan No. 24 | Course Name: AI for Business Managers | Course No.: MBA- |
| | Topic: Unsupervised Learning - Importance | 443 |

Objectives	At the end of the lesson the student shall be able to:
	• Understand the significance of unsupervised learning in machine learning and data analysis.
	• Identify the key benefits of unsupervised learning in business contexts.
	• Appreciate the role of unsupervised learning in discovering hidden patterns and insights.
	• Recognize the limitations and challenges of unsupervised learning.
Teaching Aids (if any)	a. Interactive Projector
	b. Slides illustrating the importance and use cases of unsupervised learning.
Teaching Development	1. **Introduction** (10 minutes)
	- Introduce unsupervised learning as a crucial method in machine learning where models are not provided with labeled data and must find patterns independently.
	- Discuss how unsupervised learning is increasingly important in business as it helps identify underlying structures and relationships in large datasets.
	- Contrast the importance of unsupervised learning with supervised learning by highlighting its ability to discover hidden patterns in unlabeled data.
	Development (30 minutes)
	a. Importance of Unsupervised Learning? (10 minutes):
	• Explain why unsupervised learning is essential:
	• Discover Hidden Patterns: It helps to find patterns, correlations, or groupings in data without needing prior labels.
	• Data Exploration: Useful in the initial exploration phase of data analysis where labels might not be available or known.
	• Scalability: Can handle large volumes of unlabeled data, making it suitable for modern big data applications.
	• Enhanced Decision-Making: By uncovering trends and relationships, unsupervised learning supports better business decisions, such as customer segmentation or anomaly detection.
	b. Key Benefits in Business (10 minutes):
	• Discuss the benefits of unsupervised learning in business contexts:

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

श्रेष्ठ 🎓   श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

<table>
<tr><td></td><td>

- Customer Segmentation: Grouping customers into segments based on behavior for personalized marketing strategies.
- Anomaly Detection: Identifying unusual patterns such as fraud or defective products in manufacturing.
- Market Basket Analysis: Understanding product affinities to improve sales strategies (e.g., cross-selling).
- Data Preprocessing: Reducing dimensionality for simplifying models and improving computational efficiency.

   c. **Challenges and Limitations** (10 minutes):

- • Discuss the challenges of unsupervised learning:
- No Ground Truth: Without labeled data, evaluating the model's performance can be difficult.
- Complexity of Interpretation: The patterns or clusters identified may not always have clear interpretations or business relevance.
- Requires Domain Expertise: Often, domain knowledge is needed to effectively interpret the results.
- • Discuss how understanding the limitations helps businesses use unsupervised learning more effectively.

2. **Exercise** (5 minutes) –
  - Provide a simple dataset (e.g., customer purchasing data) and ask students to:
  - Apply a clustering algorithm to segment customers.
  - Discuss the potential business impact of the discovered patterns.

</td></tr>
<tr><td>**Closure**</td><td>

1. Summarize the key takeaways:
   a. Unsupervised learning is crucial for discovering hidden insights and patterns, especially when labeled data is unavailable.
   b. It plays a key role in applications like customer segmentation, fraud detection, and anomaly analysis in business.
   c. While it offers many benefits, it also has limitations in terms of evaluation and interpretation.
2. **Suggested Reading**
   AI for Business Managers (chapter on data analysis techniques in machine learning).
3. Suggested video lecture
   - Introduction to Statistics for Machine Learning:
   https://www.coursera.org/learn/statistics-machine-learning
4. Homework
   - Write a report on how unsupervised learning can be used in business for customer behavior analysis.

</td></tr>
</table>

Save Paper
Save Trees
Save the World
Dr. Arun K. Gupta Teaching-Learning Centre ——————————— Version 1.1

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	    ○ Why is unsupervised learning particularly important when labeled data is scarce?
	    ○ How can businesses benefit from discovering hidden patterns using unsupervised learning?
	    ○ What challenges might businesses face when implementing unsupervised learning techniques?
	Spend 5 minutes to wrap up and consolidate the learnings

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————— Version 1.1

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

Lesson Plan No. 25	Course Name: AI for Business Managers	Course No.: MBA-
	Topic: Types of Unsupervised Learning	443

Objectives	At the end of the lesson the student shall be able to: • Identify and describe different types of unsupervised learning techniques. • Understand how clustering and association are applied in unsupervised learning. • Appreciate the relevance of each type of unsupervised learning in solving business problems. • Understand the core differences between clustering and association methods.
Teaching Aids (if any)	a. Interactive Projector b. Slides explaining types of unsupervised learning, with diagrams and examples.

Teaching Development	1. **Introduction** (10 minutes)
	    - Briefly recap unsupervised learning as a method that works with unlabeled data to discover patterns and structures.
	    - Introduce the two main types of unsupervised learning: Clustering and Association.
	    - Discuss their significance in understanding data structures without prior knowledge of labels.
	
	Development (30 minutes)
	  a. Clustering (10 minutes):
	    • Define Clustering: The process of grouping similar data points together based on their features.
	    • Explain different clustering algorithms:
	    K-Means Clustering: Divides the data into a specified number of clusters based on the similarity of features.
	    Hierarchical Clustering: Builds a tree of clusters based on similarity, useful for hierarchical relationships.
	    DBSCAN (Density-Based Spatial Clustering): Identifies clusters based on the density of points in a region.
	    • Discuss business applications of clustering:
	    Customer Segmentation: Identifying different customer groups for personalized marketing.
	    Market Segmentation: Grouping products based on sales patterns.
	
	  b. Association (10 minutes):
	    • Define Association:

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre — Version 1.1

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

	- Introduce the concept of Association Rules: These are used to identify frequently occurring item sets or behaviors. - Discuss business applications of association: 2. **Exercise** (5 minutes) –
	   - Provide a simple dataset (e.g., customer transactions or product data).
	   - Ask students to:
	   Apply clustering to segment customers.
	   Use association rules to identify frequently purchased products together.

Closure	1. Summarize the key takeaways:
	   a. The two main types of unsupervised learning are Clustering (grouping similar data points) and Association (discovering relationships between variables).
	   b. Both techniques are valuable in business for segmentation, pattern discovery, and decision-making.
	   c. Understanding these methods allows businesses to leverage data for more effective strategies.
	2. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	   - Introduction to Statistics for Machine Learning:
	   https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	   - Research how clustering can be used for product recommendations and write a short report.
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	   ○ What is the key difference between clustering and association?
	   ○ How can clustering help businesses improve customer targeting?
	   ○ In what situations would association rules be more useful than clustering?
	
	Spend 5 minutes to wrap up and consolidate the learnings

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ——————————— Version 1.1

श्रेष्ठ 🎓   श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

Lesson Plan No. 26	Course Name: AI for Business Managers **Topic:** Real Life Examples from Unsupervised Learning	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Recognize real-life applications of unsupervised learning in various industries. • Understand how clustering and association techniques are used in practical scenarios. • Analyze business problems solved through unsupervised learning. • Discuss the effectiveness and challenges of applying unsupervised learning in real-world situations.
Teaching Aids (if any)	a. Interactive Projector b. Slides explaining types of unsupervised learning, with diagrams and examples.

Teaching Development	1. **Introduction** (10 minutes)
	    - Recap unsupervised learning and its two main techniques: Clustering and Association.
	    - Briefly explain how unsupervised learning is used to discover hidden patterns and relationships in data without labeled outputs.
	    - Introduce the importance of real-world applications and how businesses use unsupervised learning to drive decision-making
	 Development (30 minutes)
	   a. Clustering (10 minutes):
	     • Customer Segmentation:
	     • Market Segmentation:
	     • Image Compression:
	   b. Association (10 minutes):
	     • Market Basket Analysis:
	     • Recommendation Systems:
	     • Fraud Detection:
	 2. **Exercise** (5 minutes) –
	    - Provide a simple dataset (e.g., customer transactions or product data).
	    - Ask students to:
	    Apply clustering to segment customers.
	    Use association rules to identify frequently purchased products together.

Closure	1. Summarize the key takeaways: a. Real-life applications of unsupervised learning help businesses solve critical problems like segmentation, recommendation, and fraud detection.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————— Version 1.1

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

	b. Techniques like clustering and association have direct, measurable impacts on business performance. c. These methods enable businesses to gain valuable insights from their data and improve decision-making. 2. **Suggested Reading** AI for Business Managers (chapter on data analysis techniques in machine learning). 3. Suggested video lecture - Introduction to Statistics for Machine Learning: https://www.coursera.org/learn/statistics-machine-learning 4. Homework - Research a business that has successfully used unsupervised learning and prepare a case study report. Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	  ○ How does clustering help businesses understand customer behavior better?
	  ○ What role do association rules play in enhancing cross-selling and up-selling strategies?
	  ○ Can you think of other industries where unsupervised learning might be useful?
	
	Spend 5 minutes to wrap up and consolidate the learnings

Lesson Plan No. 27	Course Name: AI for Business Managers Topic: Clustering	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define clustering and understand its importance in unsupervised learning. • Identify various types of clustering techniques (e.g., K-Means, hierarchical clustering). • Apply clustering methods to group data effectively. • Understand the applications of clustering in real-world business problems.
Teaching Aids (if any)	a. Interactive Projector b. Slides explaining types of unsupervised learning, with diagrams and examples.

Teaching Development	1. **Introduction** (10 minutes)
	    - Explain that clustering is an unsupervised learning technique where data points are grouped into clusters based on similarity.
	    - Introduce key concepts:
	    Cluster: A group of similar data points.
	    Unsupervised learning: The model is trained without labeled data.
	    - Discuss the importance of clustering in business applications such as customer segmentation, marketing, and pattern recognition.
	Development (30 minutes)
	  a. **Types of Clustering** (10 minutes):
	    • K-Means Clustering:
	    • Hierarchical Clustering:
	    • Image Compression:
	  b. **Example of K-Means Clustering** (10 minutes):
	    • Provide a dataset (e.g., customer spending behavior, product sales).
	    • Show how to apply the K-Means algorithm to segment the data into groups.
	    • Visualize the results by plotting the clusters with different colors and interpreting the groupings.
	  c. **Applications of Clustering in Business**
	    • Customer Segmentation:
	    • Market Segmentation:
	    • Anomaly Detection:
	    • Recommendation Systems:
	2. **Exercise** (5 minutes) –

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre

Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

	- Provide a simple dataset (e.g., customer data with features like age and income). - Ask students to: Apply K-Means clustering to segment the data. Visualize the clusters and interpret the results.

Closure	1. Summarize the key takeaways:
	    a. Clustering is a powerful technique for grouping similar data points.
	    b. Key methods like K-Means and hierarchical clustering help businesses understand their data and make informed decisions.
	 2. **Suggested Reading**
	 AI for Business Managers (chapter on data analysis techniques in machine learning).
	 3. Suggested video lecture
	 - Introduction to Statistics for Machine Learning:
	 https://www.coursera.org/learn/statistics-machine-learning
	 4. Homework
	 - Research a business that has successfully used unsupervised learning and prepare a case study report.
	 Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	 2. Reflective questions can be:
	    o What are the key differences between K-Means and hierarchical clustering?
	    o How can clustering help businesses in customer segmentation?
	    o Can clustering be used for real-time data analysis in industries like e-commerce or finance?
	
	 Spend 5 minutes to wrap up and consolidate the learnings

Dr. Arun K. Gupta Teaching-Learning Centre —————————— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

| Lesson Plan No. 28 | Course Name: AI for Business Managers | Course No.: MBA- |
| | Topic: Hierarchical Clustering | 443 |

Objectives	At the end of the lesson the student shall be able to: • Define hierarchical clustering and understand its methodology. • Differentiate between agglomerative and divisive clustering. • Apply hierarchical clustering methods to analyze datasets. • Recognize the applications of hierarchical clustering in business scenarios.
Teaching Aids (if any)	a. Interactive Projector b. Slides explaining hierarchical clustering.

Teaching Development	1. **Introduction** (10 minutes)
	    - Define Hierarchical Clustering
	    - Key Concepts:
	       ○ Dendrogram
	       ○ Agglomerative Clustering
	       ○ Divisive Clustering
	    - Importance in Business Applications:
	       ○ Customer segmentation based on behavior.
	       ○ Product categorization in retail.
	       ○ Risk analysis in finance.
	  Development (30 minutes)
	    a. **Hierarchical Clustering Methods** (10 minutes):
	      • Explain.
	      • Discuss common distance metrics (e.g., Euclidean distance, Manhattan distance).
	    b. **Applications of Hierarchical Clustering in Business** (10 minutes):
	      • Customer Segmentation: Identifying high-value customers.
	      • Fraud Detection: Grouping transactions to identify anomalies.
	      • Supply Chain Optimization: Categorizing products for inventory planning.
	      • Text Analysis: Grouping similar documents or articles.
	    c. **Applications of Clustering in Business**
	      • Customer Segmentation:
	      • Market Segmentation:
	      • Anomaly Detection:
	      • Recommendation Systems:
	2. **Exercise** (5 minutes) –
	    - Provide a simple dataset (e.g., customer data with features like age and income).

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre — Version 1.1

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

	- Ask students to: Apply K-Means clustering to segment the data. Visualize the clusters and interpret the results.

Closure	1. Summarize the key takeaways:
	    a. Hierarchical clustering builds a hierarchy of clusters using agglomerative or divisive methods.
	    b. Dendrograms are essential for visualizing and interpreting clusters.
	    c. Hierarchical clustering is widely used in business for customer analysis, fraud detection, and other applications.
	2. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	- Introduction to Statistics for Machine Learning:
	https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	- Research an industry where hierarchical clustering is applied (e.g., retail, banking).
	- Prepare a report highlighting:
	The problem addressed using hierarchical clustering.
	The business insights gained.
	
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	    o What are the main differences between hierarchical and K-Means clustering?
	    o How do dendrograms help in determining the number of clusters?
	    o Why would hierarchical clustering be preferred over other methods for certain datasets?
	
	Spend 5 minutes to wrap up and consolidate the learnings.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ————————————— Version 1.1

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

Lesson Plan No. 29	Course Name: AI for Business Managers **Topic:** Partitioning Clustering	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: - Define hierarchical clustering and understand its methodology. - Differentiate between agglomerative and divisive clustering. - Apply hierarchical clustering methods to analyze datasets. - Recognize the applications of hierarchical clustering in business scenarios.
Teaching Aids (if any)	a. Interactive Projector b. Slides illustrating partitioning clustering with diagrams and examples.

Teaching Development	1. **Introduction** (10 minutes)
	    - Define Partitioning Clustering
	    - Key Characteristics:
	    Assigns each data point to one cluster only.
	    Optimizes the grouping by iteratively adjusting cluster centroids or medoids.
	    - Comparison with Hierarchical Clustering:
	    Partitioning clustering is faster and works well for large datasets.
	    Hierarchical clustering is better suited for smaller datasets where a hierarchy is desired.
	    - Applications in Business:
	    Customer segmentation in marketing.
	    Product categorization in retail.
	    Market segmentation for targeted advertising.
	
	  Development (30 minutes)
	    a. **K-Means Clustering** (10 minutes):
	      • Explain the process:
	        ○ Choose the number of clusters (k).
	        ○ Randomly initialize cluster centroids.
	        ○ Assign data points to the nearest cluster.
	        ○ Update centroids based on the mean of assigned points.
	        ○ Repeat until centroids stabilize.
	      • Discuss the concept of "Elbow Method" to determine the optimal number of clusters.
	    b. **K-Medoids Clustering** (10 minutes):
	      • Introduce K-Medoids: Similar to K-Means but uses actual data points (medoids) instead of centroids.
	      • Benefits: Robust to outliers and works well with non-Euclidean distance measures.
	    c. **Applications of Partitioning Clustering** (10 minutes):

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre

Version 1.1

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

	• Customer Segmentation:
	• Market Segmentation:
	• Anomaly Detection:
	• Recommendation Systems:
	2. **Exercise** (5 minutes) –
	  - Explain the steps involved in K-Means clustering.
	  - Describe the differences between K-Means and K-Medoids clustering techniques.
	  - Discuss the advantages and disadvantages of partitioning clustering compared to hierarchical clustering.

Closure	1. Summarize the key takeaways:
	  a. Partitioning clustering divides data into fixed, non-overlapping groups.
	  b. K-Means and K-Medoids are popular partitioning clustering techniques.
	  c. Partitioning clustering is widely used in customer analysis, market segmentation, and risk profiling.
	2. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	- Understanding Partitioning Clustering Methods:
	https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	  - Why is the "Elbow Method" important in K-Means clustering?
	  - How does K-Medoids handle outliers compared to K-Means?
	  - Provide examples of business scenarios where partitioning clustering would be more suitable than hierarchical clustering.
	  - What challenges might arise when using K-Means clustering with real-world data?
	
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	  ○ What are the key differences between K-Means and K-Medoids clustering?
	  ○ How can partitioning clustering methods be applied to improve customer experience in e-commerce?
	  ○ What are the limitations of K-Means when working with complex datasets?
	
	Spend 5 minutes to wrap up and consolidate the learnings.

Save Paper
Save Trees
Save the World
Dr. Arun K. Gupta Teaching-Learning Centre
Version 1.1
श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡
Please Do Not Print Unless Necessary

Lesson Plan No. 30	Course Name: AI for Business Managers	Course No.: MBA-
	Topic: K-mean clustering	443

Objectives	At the end of the lesson the student shall be able to:
	• Define hierarchical clustering and understand its methodology. • Differentiate between agglomerative and divisive clustering. • Apply hierarchical clustering methods to analyze datasets. • Recognize the applications of hierarchical clustering in business scenarios.
Teaching Aids (if any)	a. Interactive Projector b. Slides illustrating partitioning clustering with diagrams and examples.

Teaching Development	1. **Introduction** (10 minutes)
	  - Define Partitioning Clustering
	  - Key Characteristics:
	    Assigns each data point to one cluster only.
	    Optimizes the grouping by iteratively adjusting cluster centroids or medoids.
	  - Comparison with Hierarchical Clustering:
	    Partitioning clustering is faster and works well for large datasets.
	    Hierarchical clustering is better suited for smaller datasets where a hierarchy is desired.
	  - Applications in Business:
	    Customer segmentation in marketing.
	    Product categorization in retail.
	    Market segmentation for targeted advertising.
	
	  Development (30 minutes)
	  a. **K-Means Clustering** (10 minutes):
	    • Explain the process:
	      ○ Choose the number of clusters (k).
	      ○ Randomly initialize cluster centroids.
	      ○ Assign data points to the nearest cluster.
	      ○ Update centroids based on the mean of assigned points.
	      ○ Repeat until centroids stabilize.
	    • Discuss the concept of "Elbow Method" to determine the optimal number of clusters.
	  b. **K-Medoids Clustering** (10 minutes):
	    • Introduce K-Medoids: Similar to K-Means but uses actual data points (medoids) instead of centroids.
	    • Benefits: Robust to outliers and works well with non-Euclidean distance measures.
	  c. **Applications of Partitioning Clustering** (10 minutes):

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————————— Version 1.1

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

	• Customer Segmentation:
	• Market Segmentation:
	• Anomaly Detection:
	• Recommendation Systems:
	2. **Exercise** (5 minutes) –
	   - Explain the steps involved in K-Means clustering.
	   - Describe the differences between K-Means and K-Medoids clustering techniques.
	   - Discuss the advantages and disadvantages of partitioning clustering compared to hierarchical clustering.

Closure	1. Summarize the key takeaways:
	  a. Partitioning clustering divides data into fixed, non-overlapping groups.
	  b. K-Means and K-Medoids are popular partitioning clustering techniques.
	  c. Partitioning clustering is widely used in customer analysis, market segmentation, and risk profiling.
	2. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	- Understanding Partitioning Clustering Methods:
	https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	  - Why is the "Elbow Method" important in K-Means clustering?
	  - How does K-Medoids handle outliers compared to K-Means?
	  - Provide examples of business scenarios where partitioning clustering would be more suitable than hierarchical clustering.
	  - What challenges might arise when using K-Means clustering with real-world data?
	
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	  ○ What are the key differences between K-Means and K-Medoids clustering?
	  ○ How can partitioning clustering methods be applied to improve customer experience in e-commerce?
	  ○ What are the limitations of K-Means when working with complex datasets?
	
	Spend 5 minutes to wrap up and consolidate the learnings.

| Lesson Plan No. 31 | Course Name: AI for Business Managers | Course No.: MBA- |
| | Topic: Density Based Methods DBSCAN | 443 |

Objectives	At the end of the lesson the student shall be able to:
	• Define density-based clustering and understand its methodology.
	• Explain the working of DBSCAN (Density-Based Spatial Clustering of Applications with Noise).
	• Identify the advantages of DBSCAN over other clustering techniques.
	• Recognize real-world business applications of density-based methods.
Teaching Aids (if any)	a. Interactive Projector
	b. Slides illustrating DBSCAN with examples
Teaching Development	1. **Introduction** (10 minutes)
	- Define Density-Based Clustering
	- Key Concepts:
	○ Core Points
	○ Border Points
	○ Noise Points
	- Importance of DBSCAN:
	○ Handles clusters of arbitrary shapes.
	○ Robust to outliers.
	- Applications in Business:
	○ Fraud detection in financial transactions.
	○ Identifying spatial patterns in geospatial data.
	○ Customer segmentation for irregular purchase behaviors.
	Development (30 minutes)
	a. **Working of DBSCAN** (10 minutes):
	• Explain the process
	• Parameters
	• Steps
	b. **Comparison with Other Clustering Methods** (10 minutes):
	• DBSCAN vs K-Means:
	Handles arbitrary cluster shapes.
	Automatically detects the number of clusters.
	Robust to outliers.
	• DBSCAN vs Hierarchical Clustering:
	More scalable for large datasets.
	Requires tuning of ε and MinPts.
	c. **Applications of Partitioning Clustering** (10 minutes):
	• Fraud Detection: Identifying anomalous transaction patterns.
	• Geospatial Analysis: Clustering regions with high activity (e.g., delivery hotspots).

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre

Version 1.1

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

	- Market Segmentation: Identifying niche customer segments. - Anomaly Detection: Spotting unusual behaviors in IoT data. 2. **Exercise** (5 minutes) – - Explain the difference between core points, border points, and noise points in DBSCAN. - How does DBSCAN determine the number of clusters?

Closure	1. Summarize the key takeaways:
	  a. DBSCAN clusters data based on density, making it effective for irregularly shaped clusters.
	  b. It is robust to outliers and automatically detects the number of clusters.
	  c. Business applications include fraud detection, geospatial analysis, and anomaly detection.
	2. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	- Why is DBSCAN effective for datasets with noise and outliers?
	- How can DBSCAN be used to detect fraudulent transactions in banking?
	- Describe a scenario where DBSCAN may fail (e.g., datasets with varying density).
	- Compare DBSCAN with K-Means in terms of business usability.
	
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	  ○ Why is DBSCAN preferred for clustering datasets with non-linear cluster shapes?
	  ○ How does the choice of ε impact the results of DBSCAN?
	  ○ In which industries could DBSCAN be most impactful, and why?
	
	Spend 5 minutes to wrap up and consolidate the learnings.

Save Paper
Save Trees
Save the World
Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1
श्रेष्ठ श्रम नवीनता
Please Do Not Print Unless Necessary

Lesson Plan No. 32	Course Name: AI for Business Managers **Topic:** OPTICS (Ordering Points To Identify the Clustering Structure)	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define OPTICS and understand its methodology in density-based clustering. • Explain how OPTICS overcomes the limitations of DBSCAN. • Understand the concepts of reachability distance and core distance. • Identify real-world business scenarios where OPTICS can be applied effectively.
Teaching Aids (if any)	a. Interactive Projector b. Slides with visuals of reachability plots, core distances, and clustering results. c. Python/Jupyter Notebook Demo for implementing OPTICS on a sample dataset.

Teaching Development	1. **Introduction** (10 minutes)
	    - Define OPTICS:
	    - Key Concepts:
	      Core Distance
	      Reachability Distance
	    - Why OPTICS?
	    - Applications in Business:
	
	Development (30 minutes)
	  a. **Working of OPTICS** (10 minutes):
	    • Steps of OPTICS:
	    • Comparison with DBSCAN:
	    • Show examples with diagrams of reachability plots and how they represent clusters.
	  b. **Applications of OPTICS in Business** (10 minutes):
	    • Customer Segmentation: Clustering customers with different density behaviors.
	    • Geospatial Analysis: Analyzing regions with mixed activity levels (e.g., urban vs rural areas).
	    • Supply Chain Optimization: Identifying dense and sparse supplier regions.
	    • Market Analysis: Segmenting markets with varying consumer density.
	  c. **Limitations of OPTICS** (10 minutes):
	    • Computationally intensive for large datasets.
	    • Interpretation of reachability plots may require expertise.
	2. **Exercise** (5 minutes) –
	    - Explain the difference between core distance and reachability distance in OPTICS.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————— Version 1.1

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

		- How does OPTICS handle datasets with varying densities compared to DBSCAN? - Discuss the advantages of using reachability plots in business applications.

Closure		1. Summarize the key takeaways:
		     a. OPTICS is a density-based clustering algorithm that visualizes clusters at multiple density levels.
		     b. It overcomes the limitations of DBSCAN by accommodating varying densities.
		     c. Business applications include geospatial analysis, customer segmentation, and anomaly detection.
		 2. **Suggested Reading**
		 AI for Business Managers (chapter on data analysis techniques in machine learning).
		 3. Suggested video lecture
		 https://www.coursera.org/learn/statistics-machine-learning
		 4. Homework
		 - Why is the reachability plot important in OPTICS?
		 - Provide an example of a dataset where OPTICS would be preferred over DBSCAN.
		 - How does the choice of MinPts affect the performance of OPTICS?
		 - Describe a scenario where OPTICS could improve customer segmentation in retail.
		
		 Spend 5 minutes to wrap up and consolidate the learnings

Evaluation		1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
		 2. Reflective questions can be:
		     o What makes OPTICS more flexible than DBSCAN for clustering tasks?
		     o How can businesses leverage reachability plots to improve decision-making?
		     o In which industries would OPTICS be particularly beneficial, and why?
		
		 Spend 5 minutes to wrap up and consolidate the learnings.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

Lesson Plan No. 33	Course Name: AI for Business Managers **Topic:** Applications of Unsupervised Learning in Multiple Domains	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Understand the significance of unsupervised learning across various industries. • Identify key applications of unsupervised learning in domains such as marketing, healthcare, finance, and more. • Analyze real-world examples of how businesses use unsupervised learning for decision-making. • Develop insights into leveraging unsupervised learning techniques to solve domain-specific problems.
Teaching Aids (if any)	a. Interactive Projector b. Slides demonstrating unsupervised learning applications in different industries.

Teaching Development	1. **Introduction** (10 minutes)
	    - Define Unsupervised Learning:
	    - Why Unsupervised Learning is Important:
	    - Key Industries Leveraging Unsupervised Learning:
	    - Marketing, Healthcare, Retail, Finance, Manufacturing, and more.
	
	Development (30 minutes)
	  a. **Marketing and Customer Analytics** (10 minutes):
	    • Customer Segmentation: Grouping customers based on buying behavior or demographics.
	    • Recommendation Systems: Using clustering and association to suggest products/services.
	    • Market Basket Analysis: Identifying product associations to optimize cross-selling strategies.
	    • Example: E-commerce platforms like Amazon using clustering for targeted advertising.
	  b. **Healthcare** (10 minutes):
	    • Disease Clustering: Grouping patients based on symptoms, medical history, or genetic data.
	    • Drug Discovery: Identifying similar compounds through clustering or dimensionality reduction.
	    • Anomaly Detection: Detecting rare diseases using outlier detection methods.
	    • Example: Hospitals clustering patient data to improve diagnosis and treatment plans.
	  c. **Finance, Retail and E-Commerce and Manufacturing and IoT** (10 minutes):

	• Predictive Maintenance: Clustering sensor data to detect machinery failures.
	• Process Optimization: Identifying inefficiencies through pattern recognition.
	2. **Exercise** (5 minutes) –
	   - Discuss the role of unsupervised learning in customer segmentation.
	   - How can anomaly detection in finance help prevent fraud?
	   - Explain how clustering can be used in healthcare for disease diagnosis.

Closure	1. Summarize the key takeaways:
	   a. Unsupervised learning helps discover hidden patterns in data across industries.
	   b. Applications range from customer analytics to fraud detection and predictive maintenance.
	   c. Businesses leverage clustering, association, and dimensionality reduction to gain actionable insights.
	2. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	   - Identify three industries where unsupervised learning is applied and discuss its impact.
	   - Research a real-world case where clustering was used to solve a business problem.
	   - How can dimensionality reduction help in big data analysis?
	   - Compare the role of unsupervised learning in marketing and finance.
	
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	   ○ Why is unsupervised learning valuable in domains with large, unlabeled datasets?
	   ○ Which domain do you think benefits the most from unsupervised learning, and why?
	   ○ How can businesses overcome challenges when implementing unsupervised learning techniques?
	
	Spend 5 minutes to wrap up and consolidate the learnings.

Dr. Arun K. Gupta Teaching-Learning Centre ———————— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

Lesson Plan No. 34	Course Name: AI for Business Managers Topic: Introduction to Data Mining and Warehousing	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define data mining and data warehousing. • Understand the key differences between data mining and data warehousing. • Explain the importance of data mining and warehousing in business decision-making. • Identify real-world examples where these concepts are applied.
Teaching Aids (if any)	a. Interactive Projector b. Slides explaining data mining and warehousing.

Teaching Development	1. **Introduction** (10 minutes)
	    - Define Data Mining:
	    - Define Data Warehousing:
	    - Key Difference:
	    - Importance in Business:
	    - Data Mining: Drives informed decision-making by uncovering trends.
	    - Data Warehousing: Ensures data is structured, accessible, and ready for analysis.
	Development (30 minutes)
	  a. **Components of Data Warehousing** (10 minutes):
	    • Data Sources: Collecting data from various systems (e.g., CRM, ERP).
	    • ETL Process (Extract, Transform, Load):
	    Extract data from sources.
	    Transform it into a usable format.
	    Load it into the data warehouse.
	    • Central Repository: A single location where all the data is stored.
	    • Tools for Access: Business Intelligence (BI) tools like Tableau or Power BI.
	  b. **Key Techniques in Data Mining** (10 minutes):
	    • Association Rule Learning: Finding relationships between variables (e.g., "customers who buy X often buy Y").
	    • Clustering: Grouping similar data points.
	    • Classification: Categorizing data into predefined groups.
	    • Anomaly Detection: Identifying unusual patterns or outliers.
	  c. **Applications in Business** (10 minutes):
	    • Retail: Customer segmentation, market basket analysis.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

श्रेष्ठ ☺ श्रम ☺ नवीनता ☺

Please Do Not Print Unless Necessary

	• Healthcare: Predicting disease outbreaks, patient clustering. • Finance: Fraud detection, credit risk analysis. • Manufacturing: Quality control, predictive maintenance. 2. **Exercise** (5 minutes) – - Define data mining and data warehousing in simple terms. - Why is data warehousing important for businesses? - Explain the difference between clustering and classification in data mining.

Closure	1. Summarize the key takeaways:
	    a. Data warehousing focuses on storing and managing data, while data mining focuses on analyzing data to extract insights.
	    b. Both are crucial for making data-driven decisions in businesses.
	    c. Applications include customer analytics, fraud detection, and predictive modeling.
	 2. **Suggested Reading**
	 AI for Business Managers (chapter on data analysis techniques in machine learning).
	 3. Suggested video lecture
	 https://www.coursera.org/learn/statistics-machine-learning
	 4. Homework
	 - Identify three industries that rely heavily on data mining and explain why.
	 - What role does ETL play in data warehousing?
	 - Research a case where data mining was used successfully in business.
	
	 Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	 2. Reflective questions can be:
	    o How can data mining improve customer satisfaction?
	    o Why is it important to have a centralized data warehouse for businesses?
	    o Can businesses operate effectively without data warehousing or mining? Why or why not?
	
	 Spend 5 minutes to wrap up and consolidate the learnings.

Lesson Plan No. 35	Course Name: AI for Business Managers **Topic:** Introduction to Data Mining Systems	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define data mining systems and their role in extracting insights from data. • Understand the architecture and components of a data mining system. • Explain the functionalities and tools commonly used in data mining systems. • Recognize the importance of data mining systems in business decision-making.
Teaching Aids (if any)	a. Interactive Projector b. Slides explaining the architecture of data mining systems.

Teaching Development	1. **Introduction** (10 minutes)
	    - Define Data Mining Systems:
	    Systems or software designed to identify patterns, relationships, and insights from large datasets.
	    - Why Are Data Mining Systems Important?
	    Automate the process of extracting meaningful insights.
	    Help businesses analyze data faster and more accurately.
	    - Examples of Use:
	    Predicting customer behavior in retail.
	    Detecting fraudulent transactions in banking.
	
	  Development (30 minutes)
	    a. **Architecture of a Data Mining System** (10 minutes):
	      • Key Components:
	      Data Sources:
	      Internal (e.g., CRM systems, transaction databases).
	      External (e.g., social media, market research data).
	      • Data Warehouse: Central repository for storing data.
	      Data Mining Engine: Core component that applies algorithms (e.g., clustering, classification, regression).
	      Pattern Evaluation Module: Interprets patterns to make them understandable.
	      User Interface: Visual tools for end-users to interact with results.
	      • Diagram of Architecture:
	      Display a diagram with all components connected.
	    b. **Functionalities of Data Mining Systems** (10 minutes):
	      • Data Preprocessing:
	      • Pattern Discovery:
	      • Prediction and Forecasting:

- Visualization:
  c. **Tools for Data Mining** (10 minutes):
    - Popular Data Mining Tools:
    - RapidMiner: Easy-to-use for clustering, classification, and regression.
    - Weka: Open-source tool with visualization and algorithm support.
    - SAS Data Mining: Advanced analytics and enterprise-level integration.

2. **Exercise** (5 minutes) –
   - Define the role of the data mining engine in a system.
   - Why is data preprocessing an essential step in a data mining system?
   - List three tools used for data mining and their main features.

Closure	1. Summarize the key takeaways:
	   a. Data mining systems automate the process of discovering meaningful insights from data.
	   b. Key components include data sources, mining engines, pattern evaluation, and user interfaces.
	   c. Popular tools like RapidMiner and Weka make data mining accessible and efficient for businesses.
	
	2. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	  - Explain the importance of the user interface in a data mining system.
	  - Research a real-world example of a business using a data mining tool and describe its impact.
	  - What challenges might a company face when implementing a data mining system?
	
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	   ○ How do data mining systems help businesses gain a competitive edge?
	   ○ What are the advantages of using tools like RapidMiner or Weka over manual data analysis?
	   ○ What industries rely heavily on data mining systems, and why?

Save Paper
Save Trees
Save the World
Dr. Arun K. Gupta Teaching-Learning Centre ———— Version 1.1
श्रेष्ठ श्रम नवीनता
Please Do Not Print Unless Necessary

	Spend 5 minutes to wrap up and consolidate the learnings.

Lesson Plan No. 36	Course Name: AI for Business Managers **Topic:** Knowledge Discovery Process	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Define the knowledge discovery process (KDP). • Understand the stages involved in the knowledge discovery process. • Explain how KDP is applied to extract meaningful insights from data. • Recognize the role of KDP in business decision-making.
Teaching Aids (if any)	a. Interactive Projector b. Slides explaining KDP workflow.

Teaching Development	1. **Introduction** (10 minutes)
	    - • Define Knowledge Discovery Process (KDP):
	    - Importance of KDP in Business:
	      Provides actionable insights for better decision-making.
	      Used in customer segmentation, fraud detection, and market trend analysis.
	      Example Use Case
	  Development (30 minutes)
	  a. **Stages of the Knowledge Discovery Process** (10 minutes):
	    • Data Selection:
	    • Data Preprocessing:
	      Clean, integrate, and transform raw data into a usable format.
	      Example: Handling missing values or standardizing customer names.
	    • Data Transformation:
	      Reduce dimensionality or aggregate data to make it more manageable.
	      Example: Converting detailed transaction data into summary statistics.
	    • Data Mining:
	      Apply algorithms to identify patterns and relationships.
	      Techniques: Clustering, classification, association rule mining.
	    • Pattern Evaluation:
	    • Example: Using Power BI to create a sales performance dashboard.
	  b. **Key Benefits of KDP** (10 minutes):
	    • Provides a structured approach to data analysis.
	    • Helps uncover hidden trends and patterns.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————— Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

	• Reduces decision-making risks by relying on data-driven insights.
	c. Applications of KDP in Business (10 minutes):
	    • Customer Relationship Management (CRM): Improve customer retention strategies.
	    • Fraud Detection: Identify anomalies in financial transactions.
	    • Market Analysis: Predict sales trends and optimize marketing efforts.
	2. **Exercise** (5 minutes) –
	    - List the main stages of the knowledge discovery process.
	    - Why is data preprocessing a critical step in KDP?
	    - Explain how pattern evaluation ensures the relevance of insights in KDP.

Closure	1. Summarize the key takeaways:
	    a. The knowledge discovery process transforms raw data into actionable insights.
	    b. Key stages include data selection, preprocessing, transformation, mining, evaluation, and presentation.
	    c. KDP is crucial for businesses to gain a competitive edge by making informed decisions.
	2. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	    - Research and describe a case where the knowledge discovery process was successfully implemented in a business.
	    - Explain the challenges businesses might face during the data preprocessing stage.
	    - Discuss how KDP can be used in your industry or area of interest to improve decision-making.
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	    ○ How is KDP different from traditional data analysis techniques?
	    ○ What industries benefit the most from using the knowledge discovery process?
	    ○ Why is the presentation of knowledge critical in KDP?
	
	Spend 5 minutes to wrap up and consolidate the learnings.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————— Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

| Lesson Plan No. 37 | Course Name: AI for Business Managers | Course No.: MBA- |
| | Topic: Data Mining Techniques | 443 |

Objectives	At the end of the lesson the student shall be able to: • Understand the concept of data mining techniques and their classification. • Explain various data mining techniques such as classification, clustering, regression, and association rule mining. • Identify the appropriate technique for specific business problems. • Recognize the applications of these techniques in real-world scenarios.
Teaching Aids (if any)	a. Interactive Projector b. Slides visual examples of data mining techniques.

Teaching Development	1. **Introduction** (10 minutes)
	    - Define Data Mining Techniques:
	    Methods or algorithms used to extract meaningful patterns from large datasets.
	    - Why Are They Important?
	    Help businesses make predictions, identify trends, and uncover hidden relationships.
	    - Examples of Use Cases:
	    Predicting customer churn in telecom.
	    Market basket analysis in retail.
	
	  Development (30 minutes)
	    a. **Overview of Data Mining Techniques** (10 minutes):
	      • Classification:
	      Assign data to predefined categories or labels.
	      • Clustering:
	      Group similar data points without predefined labels.
	      • Regression:
	      Predict a continuous value based on input data.
	      • Association Rule Mining:
	      Discover relationships between variables in transactional data.
	    b. **Steps to Apply Each Technique** (10 minutes):
	      • Data collection and preprocessing.
	      • Selecting the appropriate algorithm for the problem.
	      • Training the model on historical data.
	      • Evaluating and interpreting the results.
	      • Example workflow for classification using customer churn prediction.
	    c. **Applications of KDP in Business** (10 minutes):
	      • Classification:
	      Fraud detection in banking.
	      Diagnosing diseases in healthcare.

Dr. Arun K. Gupta Teaching-Learning Centre ———————— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

	• Clustering:
	 Grouping customers by buying behavior.
	 Organizing similar products in e-commerce.
	 • Regression:
	 Predicting house prices in real estate.
	 Demand forecasting in supply chains.
	 • Association Rule Mining:
	 Cross-selling in retail stores.
	 Recommendation engines in streaming services.
	 2. **Exercise** (5 minutes) –
	   - Define classification and provide a business example.
	   - Differentiate between clustering and regression.
	   - Explain the role of association rule mining in market basket analysis.

Closure	1. Summarize the key takeaways:
	   a. Data mining techniques help businesses derive actionable insights.
	   b. Key techniques include classification, clustering, regression, and association rule mining.
	   c. Choosing the right technique depends on the nature of the business problem and the type of data available.
	 2. **Suggested Reading**
	 AI for Business Managers (chapter on data analysis techniques in machine learning).
	 3. Suggested video lecture
	 https://www.coursera.org/learn/statistics-machine-learning
	 4. Homework
	   - Research and describe a real-world application of clustering in marketing.
	   - How can regression be used for sales forecasting in a business?
	   - What are the limitations of association rule mining in data mining?
	
	 Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	 2. Reflective questions can be:
	   ○ How do data mining techniques help businesses stay competitive?
	   ○ Why is data preprocessing important before applying these techniques?
	   ○ Can multiple techniques be used together to solve a business problem?
	
	 Spend 5 minutes to wrap up and consolidate the learnings.

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

Model Institute of Engineering
& Technology (Autonomous)
Lesson Plan

MIET
FUTURE BEGINS HERE....

Kot Bhalwal, Jammu

Lesson Plan No. 38	Course Name: AI for Business Managers **Topic:** Data Mining Issues	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Understand the key challenges and issues in data mining. • Recognize the impact of these issues on data mining processes and business outcomes. • Discuss ethical and legal considerations in data mining. • Propose strategies to address common data mining issues.
Teaching Aids (if any)	a. Interactive Projector b. Slides examples of data mining challenges and solutions.

Teaching Development	1. **Introduction** (10 minutes)
	    - Define Data Mining Issues:
	    Challenges that arise during the process of extracting insights from data.
	    Impact: Can hinder the effectiveness and reliability of data mining results.
	    - Importance of Addressing Issues:
	    Ensures accuracy, scalability, and ethical compliance of data mining outcomes.
	    - Example of a Common Issue:
	    Poor-quality data leading to inaccurate predictions.
	
	  Development (30 minutes)
	    a. Types of Data Mining Issues (10 minutes):
	      • Data Quality Issues:
	      • Scalability and Performance:
	      • Data Privacy and Security:
	      • Interpretability of Results:
	      • Integration of Data from Multiple Sources:
	      • Ethical Concerns:
	    b. Strategies to Address Data Mining Issues (10 minutes):
	      • Improving Data Quality:
	      • Enhancing Scalability:
	      • Ensuring Privacy and Security:
	      • Promoting Ethical Practices:
	      • Improving Interpretability:
	    c. Applications of Addressing Issues (10 minutes):
	      • How resolving issues improves business outcomes:
	      • Reliable fraud detection in banking.
	      • Accurate customer segmentation in marketing.
	      • Ethical AI systems in healthcare and recruitment.
	2. **Exercise** (5 minutes) –
	    - Explain the importance of addressing data privacy issues in data mining.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

	- What are the challenges of integrating data from multiple sources? - Suggest ways to improve the interpretability of complex models.

Closure	1. Summarize the key takeaways:
	    a. Data mining issues can impact the quality, security, and usability of insights.
	    b. Addressing these challenges ensures more effective and ethical data mining.
	    c. Strategies like data cleaning, distributed systems, and ethical oversight are crucial for success.
	2. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	  - Research a real-world example where data mining faced significant issues. Explain how these issues were resolved.
	  - What are the legal implications of not addressing privacy concerns in data mining?
	  - Write a short essay on the ethical challenges of data mining in AI systems.
	
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	    o What are the most critical issues businesses face in data mining?
	    o How do scalability and data quality impact the results of data mining?
	    o Why is ethical oversight important in modern data mining systems?
	
	Spend 5 minutes to wrap up and consolidate the learnings.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

श्रेष्ठ ☘ श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

Lesson Plan No. 39	Course Name: AI for Business Managers **Topic:** Data Mining Applications	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Understand the various applications of data mining in real-world business contexts. • Identify the key benefits of applying data mining techniques across industries. • Discuss the impact of data mining applications on business decision-making. • Examine case studies where data mining has been successfully implemented.
Teaching Aids (if any)	a. Interactive Projector b. S Slides showcasing real-world examples and case studies of data mining applications.

Teaching Development	1. **Introduction** (10 minutes)
	    - Define Data Mining Applications:
	    Practical use of data mining techniques to solve real-world business problems and gain valuable insights.
	    - Importance in Business:
	    Data mining helps businesses to make informed decisions, predict future trends, and uncover hidden patterns in data.
	    - Overview of Key Areas:
	    Customer relationship management, fraud detection, market basket analysis, and recommendation systems.
	
	Development (30 minutes)
	  a. **Common Applications of Data Mining in Business** (10 minutes):
	    • Customer Relationship Management (CRM):
	    • Fraud Detection:
	    • Market Basket Analysis:
	    • Recommendation Systems:
	    • Supply Chain Optimization:
	    • Sentiment Analysis:
	  b. **Industry-Specific Applications** (10 minutes):
	    • Healthcare:
	    • Banking:
	    • Retail:
	    • E-commerce:
	  c. **Benefits of Data Mining Applications** (10 minutes):
	    • Informed Decision Making:
	    • Competitive Advantage:
	    • Cost Reduction:

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ——————————————— Version 1.1

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

	2. **Exercise** (5 minutes) – - How can data mining help businesses improve customer relationships? - Explain how market basket analysis can drive sales in retail businesses. - Discuss the role of data mining in fraud detection.
Closure	1. Summarize the key takeaways: a. Data mining applications help businesses optimize their operations, understand customer behavior, and make more informed decisions. b. Major applications include CRM, fraud detection, market basket analysis, recommendation systems, and supply chain optimization. c. Real-world examples from various industries demonstrate the broad utility of data mining. 2. **Suggested Reading** AI for Business Managers (chapter on data analysis techniques in machine learning). 3. Suggested video lecture https://www.coursera.org/learn/statistics-machine-learning 4. Homework - Research a company that uses data mining for fraud detection and summarize how they do it. - How does market basket analysis improve cross-selling and up-selling strategies in retail? - Write an essay on how recommendation systems have transformed the e-commerce industry. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Reflective questions can be: ○ What are the key business areas where data mining has the most impact? ○ How can businesses ensure the ethical use of data mining techniques? ○ What challenges might arise when implementing data mining applications in a company? Spend 5 minutes to wrap up and consolidate the learnings.

Dr. Arun K. Gupta Teaching-Learning Centre ——————————————— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ 🎓   श्रम ⚙️ नवीनता 💡

Please Do Not Print Unless Necessary

Lesson Plan No. 40	Course Name: AI for Business Managers **Topic:** Data Objects and attribute types	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Understand the concept of data objects and attributes in the context of data mining. • Identify and differentiate between various types of attributes. • Apply knowledge of data objects and attributes to business data analysis. • Discuss how the choice of attribute type impacts the data mining process.
Teaching Aids (if any)	a. Interactive Projector b. Slides explaining different data objects and attribute types with examples.

Teaching Development	1. **Introduction** (10 minutes)
	    - Define Data Objects and Attributes:
	    Data Objects: Entities that data mining methods analyze, e.g., customers, transactions, products.
	    Attributes: Characteristics or features that describe data objects, e.g., age, income, product type.
	    - Importance in Data Mining:
	    The quality and type of data objects and attributes affect the outcome of data mining algorithms. Understanding attribute types helps in choosing appropriate algorithms for analysis.
	
	Development (30 minutes)
	  a. Types of Data Objects (10 minutes):
	    • Flat Data Objects:
	    • Multidimensional Data Objects:
	    • Complex Data Objects:
	  b. Types of Attributes (10 minutes):
	    • Categorical (Nominal) Attributes:
	    • Ordinal Attributes:
	    • Numerical (Quantitative) Attributes:
	    • Discrete Attributes:
	    • Continuous Attributes:
	  c. Impact of Attribute Types on Data Mining (10 minutes):
	    • Choosing the Right Attribute Type:
	    • Impact on Data Representation:
	2. **Exercise** (5 minutes) –
	    - Define and give an example of a categorical attribute and an ordinal attribute.
	    - Explain the difference between discrete and continuous attributes, providing a business example for each.

श्रेष्ठ 🎓   श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

	- How does the choice of data object and attribute type impact the analysis in customer segmentation?

Closure	1. Summarize the key takeaways:
	   a. Data objects are the entities analyzed in data mining, and attributes describe these objects.
	   b. Different types of attributes include categorical, ordinal, numerical, discrete, and continuous, and each plays a key role in the analysis process.
	   c. Understanding attribute types helps in selecting the appropriate data mining technique and processing method
	2. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	  - Explain how ordinal and categorical attributes are handled in machine learning models.
	  - Provide examples of continuous and discrete attributes in business and how they are used in predictive analytics.
	  - Write an essay on how understanding data objects and attributes improves decision-making in marketing.
	
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	   ○ Why is it important to understand the different types of attributes when preparing data for analysis?
	   ○ How would the analysis of customer data change if the attributes were categorical instead of numerical?
	   ○ What challenges might arise if the data objects are complex, such as in the case of images or networks?
	
	Spend 5 minutes to wrap up and consolidate the learnings.

Lesson Plan No. 41	Course Name: AI for Business Managers	Course No.: MBA-443
	Topic: Statistical description of data	

Objectives	At the end of the lesson the student shall be able to: • Understand the basic statistical measures used for describing data. • Calculate and interpret key statistical measures such as mean, median, mode, variance, and standard deviation. • Understand the role of statistical description in data analysis and business decision-making. • Apply statistical description techniques to summarize and interpret datasets.
Teaching Aids (if any)	a. Interactive Projector b. Slides with examples and illustrations of statistical measures.

Teaching Development	1. **Introduction** (10 minutes)
	    - Define Data Objects and Attributes:
	    - Define Statistical Description of Data:
	    - Importance in Business:
	      Helps businesses make sense of data and make informed decisions.
	
	Development (30 minutes)
	  a. **Measures of Central Tendency** (10 minutes):
	    • Mean (Average):
	      The arithmetic average of all data points.
	      Example: Average income of customers in a survey.
	    • Median:
	      The middle value when the data is ordered.
	      Used when data is skewed or has outliers.
	      Example: Median age of employees in a company.
	    • Mode:
	      The value that occurs most frequently in the dataset.
	      Example: Most common product purchased by customers.
	  b. **Measures of Dispersion** (10 minutes):
	    • Range:
	      Difference between the maximum and minimum values in the dataset.
	      Example: Range of prices for a product in the market.
	    • Variance:
	      Measure of how much each data point deviates from the mean.
	      Formula
	      Example: Variability in sales revenue across different regions.
	    • Standard Deviation:
	      Formula: Standard Deviation

Save Paper
Save Trees
Save the World
Dr. Arun K. Gupta Teaching-Learning Centre
Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

	Example: Standard deviation in the delivery times of products.
	c. **Visualization of Data** (10 minutes):
	• Histograms and Box Plots: Visual methods to show the distribution and spread of data. Example: Histogram showing the distribution of customer ages.
	• Use of Charts and Graphs in Business: Helps in identifying patterns, trends, and anomalies in the data.
	2. **Exercise** (5 minutes) –
	- What is the difference between the mean and median, and why would you use one over the other in business data analysis?
	- Explain the significance of standard deviation in evaluating business risks.
	- How would you use descriptive statistics to summarize the sales data for a retail business?
Closure	1. Summarize the key takeaways:
	a. Descriptive statistics provide essential tools for summarizing and analyzing data.
	b. Key measures include mean, median, mode, variance, and standard deviation.
	c. These measures help businesses make sense of data and inform decisions.
	2. **Suggested Reading** AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	- Calculate the mean, median, and standard deviation for a dataset of your choice (e.g., product prices, customer ratings).
	Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	○ How do measures like the mean and median help businesses understand customer preferences?
	○ Why is standard deviation an important tool in assessing business risk?
	○ How can businesses use visualization techniques like histograms to better understand data?
	Spend 5 minutes to wrap up and consolidate the learnings.

Dr. Arun K. Gupta Teaching-Learning Centre ——————————————— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

Lesson Plan No. 42	Course Name: AI for Business Managers **Topic:** Data Preprocessing – Cleaning, Integration	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Understand the importance of data preprocessing in machine learning and business analytics. • Learn key steps in data cleaning and integration. • Apply basic techniques for cleaning and integrating data for analysis.
Teaching Aids (if any)	a. Interactive Projector b. Slides with examples of data cleaning and integration steps.

Teaching Development	1. **Introduction** (10 minutes)
	    - Define Data Preprocessing:
	      The process of preparing raw data to make it suitable for analysis by cleaning and integrating datasets.
	    - Importance in Data Analysis:
	      High-quality data is essential for accurate models and meaningful business insights.
	Development (30 minutes)
	  a. Data Cleaning (15 minutes):
	    • Handling Missing Data:
	      Removing or imputing missing values (mean, median, or mode imputation).
	    • Removing Duplicates:
	      Identifying and removing duplicate records to avoid bias in analysis.
	    • Handling Outliers:
	      Identifying and managing extreme values that may distort the analysis.
	  b. Data Integration (15 minutes):
	    • Combining Data from Multiple Sources:
	      Merging datasets from different databases or sources into a unified dataset.
	    • Dealing with Conflicting Data:
	      Resolving inconsistencies that arise when merging data (e.g., conflicting information about customers).
	2. **Exercise** (5 minutes) –
	    - Why is data cleaning crucial before applying machine learning models?
	    - How would you handle missing data in a business dataset?
	    - Explain how data integration might affect the analysis of sales data across different regions.

Save Paper
Save Trees
Save the World
Dr. Arun K. Gupta Teaching-Learning Centre
Version 1.1
श्रेष्ठ श्रम नवीनता
Please Do Not Print Unless Necessary

Closure	1. Summarize the key takeaways:
	   a. Data preprocessing is essential for effective analysis and decision-making in business.
	   b. Cleaning involves handling missing values, duplicates, and outliers, while integration combines datasets from multiple sources.
	2. **Suggested Reading**
	   AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	   https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	   - Describe how you would clean a dataset with missing values in a customer feedback dataset.
	   - Write a short note on why data integration is important for business decision-making.
	
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	   ○ How does data cleaning improve the accuracy of machine learning models?
	   ○ What challenges might arise during data integration, and how can they be resolved?
	
	Spend 5 minutes to wrap up and consolidate the learnings.

Lesson Plan No. 43	Course Name: AI for Business Managers Topic: Data Reduction, Transformation and discretization	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Understand the concepts of data reduction, transformation, and discretization. • Apply basic techniques to reduce, transform, and discretize data for analysis. • Recognize the importance of these techniques in optimizing data for machine learning models and business decision-making.
Teaching Aids (if any)	a. Interactive Projector b. Slides with examples of data reduction, transformation, and discretization techniques

Teaching Development	1. **Introduction** (10 minutes)
	   - Define Data Reduction, Transformation, and Discretization:
	   - Data Reduction: Techniques to reduce the volume of data while maintaining its integrity.
	   - Data Transformation: Techniques to convert data into a suitable format for analysis.
	   - Data Discretization: Techniques to convert continuous data into discrete categories.
	   - Importance in Data Analysis:
	   Helps in simplifying models, reducing computational costs, and improving model performance.
	
	Development (30 minutes)
	  a. Data Reduction (10 minutes):
	    • Dimensionality Reduction:
	    Principal Component Analysis (PCA): Reducing the number of variables while retaining the most important information.
	    Feature Selection: Choosing a subset of relevant features based on statistical or domain knowledge.
	    • Data Sampling:
	    Using a subset of the data to represent the whole, reducing computational cost.
	  b. Data Transformation (10 minutes):
	    • • Normalization:
	    • Rescaling data to a standard range (e.g., 0 to 1) to make variables comparable.
	    • Example: Normalizing customer income data.
	    • • Standardization:
	    • Scaling data to have a mean of 0 and a standard deviation of 1.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

- Example: Standardizing product prices across different regions.

c. **Data Discretization** (10 minutes):

- Binning:
  Grouping continuous data into discrete intervals or bins.
  Example: Discretizing age into categories like "Young," "Middle-aged," and "Senior."
- Equal-width Binning:
  Dividing data into equal-width intervals.

2. **Exercise** (5 minutes) –
   - Explain the difference between data normalization and standardization.
   - How can dimensionality reduction techniques help improve business decision-making?
   - Describe a scenario where discretization would be useful in a marketing analysis.

Closure	1. Summarize the key takeaways:
	   a. Data reduction, transformation, and discretization are key preprocessing steps that help in preparing data for efficient analysis.
	   b. These techniques improve model performance, reduce computational complexity, and facilitate better decision-making in business.
	2. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	  - Describe the importance of data reduction in machine learning and its impact on business applications.
	  - Provide an example of how discretization could be applied to customer data in an e-commerce business.
	
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	   ○ How do data reduction techniques help in improving the efficiency of machine learning algorithms?
	   ○ Why might discretization be a useful step when analyzing customer data in retail or e-commerce?
	
	Spend 5 minutes to wrap up and consolidate the learnings.

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

Lesson Plan No. 44	Course Name: AI for Business Managers	Course No.: MBA-443
	Topic: Data Visualization	

Objectives	At the end of the lesson the student shall be able to: • Understand the importance and purpose of data visualization. • Learn the different types of charts and graphs used in data visualization. • Apply data visualization techniques to interpret and communicate business data.
Teaching Aids (if any)	a. Interactive Projector b. Slides with examples of common data visualization techniques.

Teaching Development	1. **Introduction** (10 minutes)
	   - Define Data Visualization:
	     The graphical representation of information and data, making complex data easy to understand by using charts, graphs, and other visual tools.
	   - Importance in Business:
	     Helps businesses to analyze data trends, make data-driven decisions, and communicate findings clearly to stakeholders.
	  Development (30 minutes)
	  a. Types of Data Visualizations (10 minutes):
	    • Bar Charts:
	    • Line Charts:
	    • Pie Charts:
	    • Scatter Plots:
	    • Heat Maps:
	  b. Principles of Effective Visualization (10 minutes):
	    • Clarity:
	     Ensure that the visualization conveys the message clearly without unnecessary complexity.
	    • Simplicity:
	     Avoid overcrowding charts with too much data.
	    • Consistency:
	     Use consistent colors and formats across charts for easy comparison.
	2. **Exercise** (5 minutes) –
	   - Why is data visualization important in business decision-making?
	   - What type of chart would you use to compare the sales performance of different products over a month, and why?

Closure	1. Summarize the key takeaways:

Dr. Arun K. Gupta Teaching-Learning Centre — Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

	a. Data visualization is a powerful tool to transform raw data into insightful, actionable information. b. Various types of visualizations (bar charts, line charts, pie charts, etc.) serve different purposes in data analysis. c. Effective visualizations help businesses understand trends, patterns, and make informed decisions. 2. **Suggested Reading** AI for Business Managers (chapter on data analysis techniques in machine learning). 3. Suggested video lecture https://www.coursera.org/learn/statistics-machine-learning 4. Homework - How can data visualization help in identifying business trends and patterns? - Create a report on how you would visualize sales data for a business to attract new customers. Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	   ○ What are the advantages of using a scatter plot over a line chart in analyzing customer data?
	   ○ How can heat maps help a business in understanding customer behavior?
	
	Spend 5 minutes to wrap up and consolidate the learnings.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ———————————————— Version 1.1

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary

Lesson Plan No. 45	Course Name: AI for Business Managers Topic: Basic Concepts – Data Warehousing Components	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Understand the basic concepts of data warehousing. • Identify and describe the key components of a data warehouse. • Recognize the role of data warehousing in business decision-making.
Teaching Aids (if any)	a. Interactive Projector b. Slides with simple diagrams explaining the components of a data warehouse.

Teaching Development	1. **Introduction** (10 minutes)
	    - What is a Data Warehouse?
	    - A data warehouse is a centralized system used to store large volumes of data from multiple sources for analysis and reporting.
	    - It helps businesses organize and analyze historical data for decision-making.
	Development (30 minutes)
	  a. Key Components of a Data Warehouse (10 minutes):
	    • Data Sources:
	    • Data Staging Area:
	    • Data Warehouse Database:
	    • ETL Process (Extract, Transform, Load):
	    • Data Mart:
	    • OLAP (Online Analytical Processing):
	  b. Role of Data Warehousing in Business (10 minutes):
	    • Improves Decision-Making:
	    By providing a centralized and organized view of historical data, a data warehouse supports better decision-making.
	    • Supports Business Intelligence:
	    Data warehouses help businesses generate insights, identify trends, and forecast future actions.
	2. **Exercise** (5 minutes) –
	    - What are the key components of a data warehouse?
	    - Explain the purpose of the ETL process in data warehousing.
	    - How does a data mart differ from a data warehouse?

Closure	1. Summarize the key takeaways: a. Data warehousing helps businesses store and organize data from multiple sources for better analysis and decision-making.

Dr. Arun K. Gupta Teaching-Learning Centre ——————————————— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

	b. Key components include data sources, staging areas, ETL processes, and OLAP tools.
	2. **Suggested Reading**
	   AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	   https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	   - Describe the role of a data staging area in the data warehousing process.
	   - Discuss how a data warehouse can improve business intelligence in an organization.
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	   ○ How do the components of a data warehouse work together to provide useful insights for businesses?
	   ○ Why is the ETL process important for maintaining data quality in a data warehouse?
	
	Spend 5 minutes to wrap up and consolidate the learnings.

Save Paper
Save Trees
Save the World

Dr. Arun K. Gupta Teaching-Learning Centre ——————————— Version 1.1

श्रेष्ठ   श्रम   नवीनता

Please Do Not Print Unless Necessary

Lesson Plan No. 46	Course Name: AI for Business Managers Topic: ETL (Extract, Transform, Load)	Course No.: MBA-443

Objectives	At the end of the lesson the student shall be able to: • Understand the ETL process and its significance in data warehousing. • Learn the steps involved in the ETL process: Extract, Transform, and Load. • Apply the concepts of ETL to real-world business data scenarios.
Teaching Aids (if any)	a. Interactive Projector b. Slides with simple flow diagrams to explain the ETL process.

Teaching Development	1. **Introduction** (10 minutes)
	    - What is ETL?
	    - ETL stands for Extract, Transform, and Load, a process used to move data from various sources to a data warehouse.
	    - ETL is essential in cleaning, transforming, and integrating data for analysis and reporting.
	Development (30 minutes)
	  a. Extract (10 minutes):
	    • Definition:
	    The extraction process involves pulling data from different sources, such as databases, CRM systems, or files.
	    • Types of Data Sources:
	    Structured data (e.g., SQL databases), semi-structured data (e.g., XML files), and unstructured data (e.g., emails, social media).
	    • Challenges:
	    Ensuring data quality and accuracy during extraction.
	  b. Transform (10 minutes):
	    • Definition:
	    • Key Transformation Tasks:
	    Data Cleaning: Removing duplicates, handling missing values, correcting errors.
	    Data Formatting: Converting data to the correct format, such as date conversion.
	    Data Aggregation: Summing, averaging, or combining data for analysis.
	    • Challenges:
	  c. Load (10 minutes):
	    • Definition:
	    Loading is the process of storing the transformed data into the data warehouse or database.

Dr. Arun K. Gupta Teaching-Learning Centre ———————— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ 🎓 श्रम ⚙ नवीनता 💡

Please Do Not Print Unless Necessary

	- Types of Loads:
	Full Load: Replaces the existing data with a new dataset.
	Incremental Load: Adds new data or updates existing data without replacing the entire dataset.
	- Challenges:
	2. **Exercise** (5 minutes) –
	   - What are the three main stages of the ETL process?
	   - Explain the challenges businesses may face during the transformation stage of ETL.
	   - Describe the difference between full and incremental data loading.

Closure	1. Summarize the key takeaways:
	   a. ETL is a crucial process for extracting, transforming, and loading data into a data warehouse for analysis.
	   b. Understanding the steps involved in ETL helps businesses organize and prepare data for better decision-making.
	2. **Suggested Reading**
	AI for Business Managers (chapter on data analysis techniques in machine learning).
	3. Suggested video lecture
	https://www.coursera.org/learn/statistics-machine-learning
	4. Homework
	   - How can the ETL process improve data accuracy and business decision-making?
	   - In what ways would a business implement incremental loading instead of full loading, and why?
	
	Spend 5 minutes to wrap up and consolidate the learnings

Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.
	2. Reflective questions can be:
	   o Why is the ETL process critical for data integration in a data warehouse?
	   o How do data transformations affect the quality and usability of business data?
	
	Spend 5 minutes to wrap up and consolidate the learnings.

Dr. Arun K. Gupta Teaching-Learning Centre —————————————— Version 1.1

Save Paper
Save Trees
Save the World

श्रेष्ठ श्रम नवीनता

Please Do Not Print Unless Necessary