BUAN 6V99.001 "AI in Business" – Spring 2025 Course Syllabus (Final)

Course Information

Course Title:	AI in Business
Course Number:	BUAN 6V99.001
Term:	Spring, 2025
Class Time:	Tues, 1:00 – 3:45 pm
Class Location:	JSOM 2.102
Class Level:	Graduate
Semester Credit Hours:	3 credits
Instruction Mode:	Face to Face
Activity Type:	Lecture
Target Audience:	Business Analytics and AI, IT Management, MBA students with an interest in real-world AI business applications.

Professor Contact Information

Instructor:	Ashim Bose, Ph.D.
Office Location:	JSOM 3-424
Office Hours:	Mon 4:00–5:00 pm & Thur 5:00–6:00 pm or by Appointment
Email:	ashim.bose@utdallas.edu
Teaching Assistant:	Afnan Khan

Pre-Requisites:	Instructor Permission

Course Description:

This course provides a broad overview of major AI (including Generative AI) technologies and applications in business, balancing theory with practical hands-on skills by going deep in key areas. In addition to learning core AI concepts around Machine Learning, Generative AI, Prompt Design & Engineering, students will learn the business aspects of leveraging and deploying AI. They will get exposure to major AI use-cases in multiple domains such as Sales & Marketing, Healthcare, Supply Chain, Operations Management, Finance, Software Development, Sports and Media, Human Resource Management etc. while working on exercises and a project to get hands-on experience building and deploying various types of AI. Given the rapid pace of innovation in this space, students will also be expected to share their discoveries and learnings with the class.

Course Objectives:

- Most IS jobs will now require the ability to leverage AI. This course will provide an understanding of how AI is used to solve real-world Business problems in multiple industries
- Understand the primary use cases for AI in key domains such as Sales & Marketing, Healthcare, Supply Chain, Manufacturing, Operations Management and more

- Understand the latest innovations in Generative AI, its uses, and best practices including prompt engineering
- Develop hands-on technical and business skills to solve real world problems
- Practice technology presentation skills which are key to success in business

Hands-on Work:

- Exercises to implement different types of AI with Python and Gen AI platforms
- Project to design an AI app in a specific domain (with an accompanying business case)
- Sharing of "lessons learned" with rest of class

Textbooks/Learning Platform:

1. Artificial Intelligence: Applied Artificial Intelligence in Business by Leong Chan, Liliya Hogaboam, Renzhi Cao, Springer, ISBN 978-3-031-05739-7, ISBN 978-3-031-05740-3 (eBook)
2. Supplemented with additional reading materials provided thru eLearning

Technology Platform:
Python and Gen AI platforms will be used for hands-on exercises.

Group Work: Project and Exercise work will be done in groups of 2

Lecture Outline & Schedule:
Note : *The content and schedule below is subject to change at the discretion of the Professor and will be communicated in class.*

Week	Description	Exercise
1 (1/21/25)	*Introductions, Syllabus Overview & Class Expectations* *Introduction to AI:* History, Hype Cycles *Overview of specific AI components* (Knowledge Based Systems, Fuzzy Logic, ML, Deep Learning, NLP, Gen AI)	Brush up on Python
2 (1/28/25)	*Discriminative AI (Machine Learning)*: Supervised, Unsupervised, Regression, Decision Trees; Neural Networks, Deep Learning, Reinforcement Learning, Self-Supervised Learning *Applications* *Relevant Python Libraries* *Google Colab Overview*	Groups formed
3 (2/4/25)	*Stochastic Methods in AI:* Markov Chain Monte Carlo, Genetic Algorithms, Simulated Annealing *Applications* *Relevant Python Libraries*	Exercise 1 assigned
4 (2/11/25)	*Generative AI:* Generative AI Models (GANs, VAEs, Transformers, Diffusion Models), Applications *Google Vertex AI Introduction*	
5 (2/18/25)	*Prompt Design and Engineering:* Different approaches and best practices	Exercise 1 due;

	Gen AI Challenges: Hallucinations, Deep Fakes, Prompt Injection Attacks *Major AI Software and Hardware Providers:* Open Source, Cloud Providers, Open AI, NVIDIA, Startups	Exercise 2 assigned
6 (2/25/25)	*Agentic AI* *Anatomy of an AI application*: Architecture Patterns *Data needs for your AI*: Quality, Quantity, Diversity, Availability, Structured vs Unstructured, Latency, Governance	
7 (3/4/25)	*Guest Lecture* *Business of AI:* Prioritizing Use-Cases, Revenue Streams, Cost Components, Managing Risk, AI Governance *Developing and Presenting a Business Case:* Key elements including ROI, Payback	
8 (3/11/25)	*AI in Sales and Marketing*: Market Segmentation and Targeting, Advertising, Demand Generation, AI Virtual Agent, AI Recommendation Engine, Propensity to Buy, Forecasting, Salesforce Optimization, Sales Training, Pricing, Brand Positioning, Social-Media	Exercise 2 due; Exercise 3 assigned
9 (3/18/25)	Spring Break	
10 (3/25/25)	*AI for Customer Service*; Customer Feedback, Customer Support, Customer Churn, Customer Loyalty, Social Media, Virtual Assistants *AI for Human Resources Management*: Recruitment, Turnover, Scheduling, Employee Engagement, Performance Management, Training	Project Part 1 due
11 (4/1/25)	*AI in Software Dev*: Requirements Engrg, Software Design, Project Management, Code Generation, Bug Detection, Code Refactoring, Code Review, Test Automation, Documentation Generation *AI in Energy*: Smart Grids, Smarts Homes, Smart Devices, Renewables; *AI in Entertainment*: Content Personalization, Targeted Ads, Content Recognition, Creative Assistant; *AI in Sports*: Sports Management, Coaching Assistance, Game Strategy.	
12 (4/8/25)	*AI in Transportation*: Self Driving, Route Planning, Traffic Planning *AI in Manufacturing:* Factory Planning and Scheduling, Process Automation, Digital Twin *AI in Automotive:* Autonomous vehicles, Driving Behavior, Driver Safety *AI in Operations Management*: Sales & Operations Planning, Network Planning, Scheduling, Procurement Intelligence	Exercise 3 due; Exercise 4 assigned
13 (4/15/25)	*AI in Healthcare*: Robot Assisted Surgery, Workflow Assistance, Image Diagnosis, Virtual Assistants, Fraud Detection, Wearables, Drug Discovery *AI in Real-Estate:* Demand Generation, Pricing, Predictive Maintenance, Virtual Assistants, NOI Insights, Buy/Sell/Hold Decision Support *Finance and Risk Management*: Personalized Finance, Investment Banking, Asset Management, Fraud Detection	
14 (4/22/25)	*Deploying AI:* Infrastructure, Scalability, Data Management, Data Pipelines, Integration, Cost Management, Testing and Validation *AI Operations*: Model accuracy, Model management, Model Drift *AI Ethics*: Responsible AI, Governance, Privacy, Bias Prevention, Socio-Economic impacts	Exercise 4 due

15 (4/29/25)	*Trends in AI:* Artificial General Intelligence, Neuro-Symbolic AI, Multi-modal AI, Human-AI Collaboration, AI and the Metaverse*;* AI for Emotional Support, AI Regulation and Governance *Jobs in AI:* AI App Specialist, Prompt Engineer, AI Engineer, AI Governance Officer, AI Data Engineer, AI Product Manager, AI Product Analyst	
16 (5/6/25)	Final Project Presentations with Q&A	Project – Part 2 due

Exercises

Note : *The content and schedule for the Exercises below is subject to change at the discretion of the Professor.*

Work for the Exercises is expected to be done individually.

- Exercise 1: Build a Genetic Algorithm based Schedule Optimizing engine in Python (Assigned in Week 3, due in 2 weeks)
- Exercise 2: Build a Chatbot leveraging LLM and RAG leveraging publicly available data (Assigned in Week 5, due in 3 weeks)
- Exercise 3: Build a recommendation engine for given dataset with Python (Assigned in Week 8, due in 4 weeks)
- Exercise 4: Use GenAI to write the Software and Test Scripts for a specific problem, and develop a Critique (Assigned in Week 12, due in 2 weeks)

Project Work:

You will be expected to design an AI app as part of a class project. This will be in addition to the hands-on Exercises. You will leverage lessons from the Exercises to design your AI app. Building the app is not required, but bonus points will be awarded to build a working prototype.

For your project app, you can pick a topic from below and create the following artifacts:

- Project topic choices:
    - Virtual Leasing Agent for Commercial Real-Estate
    - Virtual Factory Planning or Scheduling Assistant in Supply Chain/Manufacturing
    - Virtual Demand Forecasting Assistant in Supply Chain/Sales & Operations Planning
    - Virtual Scheduling Assistant in HealthCare
    - Virtual Diagnostics Assistant in HealthCare
    - Virtual Coaching Assistant for a Sports team (e.g. Cricket, Baseball, Football)
    - Or “Bring your own Project” with instructor approval

- Project Part 1:

    - Pick an industry and use case (from choices given above) for your AI app, elaborate on concept, and develop a business case: ppt submission

- Project Part 2:
    - Design the proposed AI app including a solution architecture, define data needed, locate/create suitable sample data, and do a presentation: in-class presentation

Grading:
Note : *The grading criteria below is subject to change at the discretion of the Professor and will be communicated in class.*

Class Participation & Sharing Lessons Learned	10%	Individual
Project Part 1	20%	Group
Project Part 2	20%	Group
Exercises	40%	Individual
Peer Evals	10%	Individual
Total	**100%**	

Opportunities for Bonus points will be announced during class

Class Size:
Initially, max of 30 for Spring 2025.

Course & Instructor Policies:
Adherence to instructions will be considered an important part of the grade. The professor's assessment of the grades is final.

Late work is not allowed after the deadline or via email submission. There will be assignment submission links provided on eLearning. Zero credit for not adhering to the deadlines. In case of family or medical emergency, which is beyond student's control, a medical report is required including of physician's information. In situations where the professor allows considering an emergency case, professor will assess the situation for penalty of points if there should be any, as many decisions are case to case basis.

In email communication, please mention the course number in subject line and use UT Dallas email address. Non-UT Dallas email addresses may not get response due to them ending up in spam folders. Apart from that, please provide 3 working days' time to professor and TA to respond before emailing again. Professor and TA will email as soon as possible, however sometimes responses may take up to 3 working days.

It is student's responsibility to check for updates in eLearning. There will be series of updates throughout the semester to provide timely information and/or updates and/or reminders.

Cell phone use is not allowed during class or exam. eLearning will be used for class content. Slides and other materials will be posted after class is held. Avoid personal conversations during lectures.

Maintain academic integrity. Academic dishonesty involves the abuse and misuse of information or people to gain an undeserved academic advantage or evaluation. Common forms include:

- Cheating – using deception in the taking of tests or the preparation of written work, using unauthorized materials, copying another person's work with or without consent, or assisting another in such activities.
- Lying – falsifying, fabricating, or forging information in either written, spoken, or video presentations.
- Plagiarism – using the published writings, data, interpretations, or ideas of another without proper documentation. Plagiarism includes copying and pasting material from the internet into assignments without properly citing the source of the material.

Episodes of academic dishonesty are reported to the Vice President for Academic Affairs. The potential penalty for academic dishonesty includes a failing grade on a particular assignment, a failing grade for the entire course, or charges against the student with the appropriate disciplinary body.

Students with Disabilities

It is the policy and practice at UT Dallas to make reasonable accommodation for students with properly documented disabilities. However, written notification from the Accessibility Resource Center (ARC) is required. If you are eligible to receive accommodation and would like to request it for this course, please discuss it with me during office hours and allow for one week's advance notice. Students with any questions about their eligibility for receiving accommodation should contact the OSA office first.

Class Materials

The instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course; however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class or uploaded to other online environments except to implement an approved ARC accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Attendance

Regular and punctual physical class attendance is expected (and graded). Students who fail to attend class regularly are inviting scholastic difficulty. Remote/virtual/online attendance is not counted or considered as the instruction mode is face-to-face.

Class Participation

Regular class participation is expected. This includes engaging in class Q&A, discussions, lessons learned in Projects and Exercises. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade for this course is directly tied to your participation in this class. It also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures. Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

The instructor may record meetings of this course. These recordings will be made available to all students registered for this class if the intent is to supplement the classroom experience. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."

Academic Support Resources

The information contained in the following link lists the University's academic support resources for all students.

Please see http://go.utdallas.edu/academic-support-resources.

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus. Please review the catalog sections regarding the credit/no credit or pass/fail grading option and withdrawal from class.

Please go to http://go.utdallas.edu/syllabus-policies for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.