University of Wisconsin-Milwaukee
Sheldon B. Lubar School of Business
Course Syllabus
Bus Adm 745 – Artificial Intelligence for Business

Class Information

Section:	001
Credits:	3
Prerequisites:	None (Grad. St. required)
Time & delivery mode	Thursday 5:30 pm – 8:10 pm (hybrid)
Location	Lubar N116 & online

Instructor Information

Name:	Atish Sinha
Office:	Lubar N363
Office Hours:	After class & by appointment on Teams
E-Mail:	sinha@uwm.edu

Learning Modules

Students will use various learning modules and articles on AI, machine learning, and deep learning.

Business Cases

Students will purchase the following business cases on AI from Harvard Business Review:

Vodafone: Managing Advanced Technologies and Artificial Intelligence (9-318-109), 2018, by William Kerr and Emer Moloney.

Tailor Brands: Artificial Intelligence-Driven Branding (9-519-017), 2020, by Jill Avery.

THE YES: Reimagining the Future of E-Commerce with Artificial Intelligence (AI) (9-521-070), 2021, by Jill Avery et al.

HubSpot and Motion AI: Chatbot-Enabled CRM (9-518-067), 2019, by Jill Avery and Thomas Steenburgh.

Vispera: Visual Intelligence for Retail (5-622-022), 2020, by Yael Grushka-Cockayne and Gamze Yucaoglu.

Course Description

This graduate course is an elective course for students in the MS in ITM program. It also counts toward the AI and Data Analytics concentration. The course will prepare students to develop Artificial Intelligence (AI) solutions, using cutting-edge machine learning technologies, for business problems. It covers various learning models, including deep learning, transfer learning, reinforcement learning, and conversational AI. Students will learn how to develop learning models using advanced AI technologies such as artificial neural networks, convolutional neural networks, recurrent neural networks, and bots.

Students will primarily use Azure Machine Learning and Azure Cognitive Services to complete a set of software exercises. Students will also work on a set of business cases that illustrate the effective application of AI technologies in industry.

Course Methodology

The course will be offered in a hybrid format – six classes will be offered online (see Course Schedule below) and the rest will be offered in the classroom. The course will adopt a variety of pedagogical methodologies: classroom lectures, online presentation of materials, online discussion, practice exercises, case presentations, and other classroom/online experiences. There will be two quizzes. Students will also work on a number of software exercises.

Learning Objectives

The objectives of the course are to help students:

1. Understand AI concepts and principles
2. Become familiar with how AI solutions are delivered for business problems
3. Realize the need for an AI strategy for modern businesses
4. Gain knowledge of various types of learning in artificial neural networks
5. Understand how deep learning, transfer learning, and reinforcement learning are implemented
6. Learn how to build convolutional neural networks, recurrent neural networks, and intelligent bots
7. Gain hands-on experience in developing AI models
8. Learn about how AI solutions are effectively delivered in real-world business contexts

Grading Policy

A student's letter grade for the course will be assigned based on the overall percentage score earned; the scheme is as follows:

A: >= 93%; A- : >= 90% but < 93%
B+ : >= 87% but < 90%; B : >= 83% but < 87%; B- : >=80% but < 83%
C+ : >= 77% but < 80%; C : >= 73% but < 77%; C- : >= 70% but < 73%
F : < 70%

The final grade for the course will be based on the student's performance in the following components:

Component	Weight
Quiz 1	15%
Quiz 2	15%
Software Exercises	42%
Class Participation	3%
Case Presentation & Report	25%

Quizzes

There will be two quizzes, which will test the student's knowledge and understanding of AI concepts, principles, techniques, and tools.

Software Exercises

Students will work individually to complete a set of software exercises using the Azure Machine Learning studio. All the exercises must be completed by the due dates. Failure to do that will result in a 2% penalty per day; assignments that are more than 5 days past the due date will not be accepted.

Class Participation

Points for class participation will be awarded on the basis of attendance, participation in class activities, and participation in case discussion.

Business Cases

Students will work in teams of four or five on analyzing cases that demonstrate real-world AI applications in business. Each team will be assigned a case to present in class and submit a written report that provides a detailed analysis of the case. Students who are not presenting a particular case will be expected to respond to a set of questions on the case and participate in discussion after the case presentation.

Workload Statement

This class meets once per week for 150 minutes, for a total of 27.5 hours of required lecture time. You should expect to take at least 45 hours over the course of the semester reading the course materials. There are also several software exercises which you should expect to require at least 30 hours. You should reserve at least 25 hours to prepare for and take the two quizzes. And you should expect to reserve 20 hours for presenting the case and preparing the case report. All told, this class is likely to take 147.5 hours of your time.

Activity	Approx. Time
• Lecture time:	27.5 hours
• Reading materials:	45 hours
• Software exercises:	30 hours
• Preparation for quizzes:	25 hours
• Case presentation & report:	20 hours
Total:	147.5 hours

Course Schedule

Week	Topics	Location
Week 1 Jan 27	Introduction to AI History of AI AI Applications in Business AI Strategy	*Online*

Modules:

Define an AI strategy to create business value
Define an AI strategy to create business value in retail
Define an AI strategy to create business value in financial services
Define an AI strategy to create business value in healthcare
Introduction to AI technology

Week	Topics	Location
Week 2 Feb 3	Machine Learning (ML) Data Analysis using Python	*Classroom*

Modules:

Explore the Azure portal
Introduction to machine learning
Introduction to data for machine learning
Explore and analyze data with Python

Week	Topics	Location
Week 3 Feb 10	Building ML Models Training and Evaluating Regression Models	*Online*

Modules:

Build classical machine learning models with supervised learning
Train and analyze regression models in machine learning
Refine and test machine learning models
Train and evaluate regression models

Week	Topics	Location
Week 4 Feb 17	Training and Evaluating Classification Models Tuning Model Performance	*Classroom*

Modules:

Create and understand classification models in machine learning
Confusion matrix and data imbalances
Measure and optimize model performance with ROC and AUC
Train and evaluate classification models

Week	Topics	Location
Week 5 Feb 24	Training Neural Networks Backpropagation learning	*Online*

Modules:

A Close Look at Neural Networks (article)
How Do Neural Networks Learn? (article)

Week 6 Mar 3	Introduction to Deep Learning Building Deep Learning Models	*Classroom*

Module:

> *Train and evaluate deep learning models*

Week 7 Mar 10	Convolutional Neural Network (CNN) Transfer Learning	*Online*

Module:

> *Train and evaluate deep learning models*

Week 8 Mar 17	*Quiz 1* Recurrent Neural Network (RNN) Attention Models	*Classroom*

Modules:

> *Introduction to PyTorch*
> *Introduction to Natural Language Processing with PyTorch*

Week 9 Mar 24	*Spring break* – no classes	

Week 10 Mar 31	Text Extraction from Images & Documents Form Recognition	*Online*

Modules:

> *Read Text in Images and Documents with the Computer Vision Service*
> *Extract data from forms with Form Recognizer*

Week 11 Apr 7	Object Detection Image Recognition Developing Computer Vision Solutions	*Classroom*

Modules:

> *Analyze images*
> *Analyze video*
> *Classify images*
> *Detect objects in images*

Week 12 Apr 14	Reinforcement Learning Personalizer	*Online*

Modules:

> *Introduction to Reinforcement Learning (article)*
> *Introduction to Microsoft Project Bonsai*
> *Introduction to Personalizer*

Week 13 Apr 21	Sentiment Analysis Named Entity Recognition Conversational AI/Bots	*Classroom*

<u>Modules:</u>

Analyze text with the Language service
Recognize and synthesize speech
Classify and moderate text with Azure Content Moderator
Create a bot with the Bot Framework Composer

Week 14 Apr 28	*Quiz 2*	*Classroom*
Week 15 May 5	Business Case Presentations	*Classroom*
Week 16 May 12	Business Case Presentations	*Classroom*

University Policies

Statement of Academic Misconduct
> Chapter UWS 14, entitled "Student Academic Disciplinary Procedures," of the Wisconsin Administrative Code contains rules enacted by the University of Wisconsin Board of Regents that apply to all University of Wisconsin-Milwaukee students. Section 14.01 states, "The Board of Regents administrators, faculty, academic staff and students of the University of Wisconsin System believe that academic honesty and integrity are fundamental to the mission of higher education and of the University of Wisconsin System. The University has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. … Student who violate these standards must be confronted and must accept the consequences of their actions."

Statement of Sexual Harassment
> Sexual harassment is reprehensible and will not be tolerated by the University. It subverts the mission of the University and threatens the careers, educational experience, and well being of students, faculty, and staff. The University will not tolerate behavior between or among members of the University community which creates an unacceptable working environment.

Discriminatory Conduct
> The University of Wisconsin-Milwaukee remains steadfastly committed to the principles of academic freedom. This commitment requires an equally strong obligation to foster respect for the dignity and worth of each individual. Without this respect, the principles of academic freedom become meaningless. Moreover, relationships such as student-faculty and employee-supervisor have inherent power differences that compromise some persons' ability to protect their own rights. Therefore, this University must provide an environment that respects the value of each individual and which does not tolerate discriminatory conduct of any kind.

University Policies Regarding Change of Registration/Adding and Dropping or Withdrawal from Classes
> After initial registration, students have the opportunity to modify their class schedule by adding, dropping or withdrawing from classes during specific periods prior to the start of the semester. Such changes can be made without financial penalty until shortly before the start of the term (or before the start of a particular summer session). However, significant financial penalties can apply for changes made beyond the appropriate deadline, and some departments have unique deadlines and approval requirements governing how and when students may add and drop particular courses. Some academic programs also require their students to obtain specific approval for adding or dropping courses. Consult the most recent *Schedule of Classes* for dates, deadlines and procedures or contact the Business School Undergraduate Student Services office.

University Policies Regarding Repeating Courses
> Unless a restriction is stated in the *Schedule of Classes*, undergraduates may repeat any course **only once.** Under exceptional circumstances, one more repeat may be

allowed following approval of a written appeal to the advising office of the student's school or college. Except in the case of courses with variable content (which may be repeated for credit as often as permitted for that particular course, as specified in UWM Bulletins), both grades earned for repeated courses will appear on the student's academic record, but only the higher grade will be calculated into the grade point average. Students illegally repeating courses will be dropped, and "WR" will be assigned to the course on the student's academic record.

Students who took a course as a repeat prior to Fall 1988 are entitled to one additional enrollment. Transfer students who did not previously take a course at UWM are entitled to one repeat at UWM of a course taken at a previous institution.

In courses of limited enrollment, qualified students who have not taken the course previously have priority. It is generally advisable for any student to consult an advisor before registering to repeat a course.

University Policy Regarding Incompletes
You may be given an incomplete if you have carried a subject successfully until near the end of the semester but, because of illness or other unusual and substantiated cause beyond your control, have been unable to take or complete the final examination or to complete some limited amount of course work. An incomplete is not given unless you prove to the instructor that you were prevented from completing the course for just cause as indicated above.

Since Fall 1988, undergraduates have been required to complete a course marked incomplete during the first eight weeks of the next semester of enrollment (excluding summer sessions). An extension to the end of the semester is possible if extenuating circumstances prevent you from completing the required course work during the first eight weeks.

Extensions must be recommended by the instructor and approved by the dean of your school or college. If you do not remove the incomplete during the first eight weeks of the next semester of enrollment, the report of I will lapse to F. Audits will lapse to U. Credit/No Credit will lapse to No Credit. If you do not enroll for the next semester, the report of I will lapse to W (withdrawal) after one year.

University Change of Grade Policy and Procedures
The following is from UWM Faculty Document No. 1927, May 12, 1994, entitled "Policies on Grading and Grade Records". Grade or Record Changes. Instructors may not change a semester grade after the grade sheet has been submitted to the Registrar except for an inadvertent error in determining or recording the grade. Any change in a student's grade or record, including retroactive change to drop, withdrawal, or incomplete, must receive the approval of the Dean of the School or College in which the student was enrolled at the time the course was taken.