

SYLLABUS

BCIS 5690: Topics in IT - Artificial Intelligence in Business Fall 2018

Lectures: BLB 035, Thursday, 6:30-9:20 PM

Instructor: Dr. Anna Sidorova, **Office:** BLB 358B

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Office Hours: Thu. 12:00-1:00, Thu. 5:00-6:00 PM, or by appointment

TEXTS & SOFTWARE

Text required: Andrew Burgess (2018) *The Executive Guide to Artificial Intelligence: How to identify and implement applications for AI in your organization* 1st edition, ISBN-13: 978-3319638195, ISBN-10: 331963819X

Text required: Bharath Ramsundar and Reza Bosagh Zadeh (2018) *TensorFlow for Deep Learning: From Linear Regression to Reinforcement Learning*, 1st Edition, O'Reilly 2018 ISBN-13: 978-1491980453, ISBN-10: 1491980451

Text recommended Aurélien Géron (2017) *Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems*, 1st Edition O'Reilly 2017, ISBN-13: 978-1491962299, ISBN-10: 1491962291

Software: Python, Tensorflow (you need to have a laptop or a PC on which you can download these programs)

Other readings may be distributed throughout the semester.

COURSE MATERIALS/WEB SITE

Course materials will be available on Blackboard.

COURSE DESCRIPTION

The course offers an integrated perspective on the opportunities and challenges associated with the introduction of artificial intelligence (AI) and machine learning capabilities into business computer information systems. Topics include technical foundation of AI, survey of current AI capabilities, AI applications in business, implications of AI for business and society and AI governance. *Prerequisite(s): none.*

Learning Objectives

Upon successful completion of this course, you are expected to:

- Become familiar with the technical foundations of AI, including problem solving, knowledge representation, automated reasoning, and machine learning;
- Become familiar with current level of AI capabilities (experimental and commercially available), and the key industry trends in relation to AI;
- Become familiar with applications of AI in business;
- Understand managerial challenges associated with the deployment of AI capabilities;
- Understand implications of AI for business and society;
- Gain exposure to AI tools and development environments;

ATTENDANCE

Attendance is expected. Arrive on time and stay for the duration of each class. If you must miss a class, you remain fully responsible for all handouts, changes in the schedule, and other information given during class. Please get the lecture notes and handouts from your classmates or from the course Web site.

COURSE ASSIGNMENTS AND EVALUATION

Your performance will be evaluated as follows:

Assignments	Points	%
Individual		
Midterm exam	200	20%
Final exam	200	20%
HW assignments (including technical assignments, case studies and topic presentations)	200 (8@25 pts. each)	20%
Class participation	100	10%
Total Individual	700	70%
Term Project/Paper (Individual or in groups of two)		
Technical report/prototype or white paper	200	20%
Presentation	100	10%
Total Team Project*	300	30%
TOTAL**	1000	100%

*The team voted as best by its classmates will get a 5-point bonus on this assignment

**Extra-credit assignment may be announced in class. The total extra credit opportunities will not be in excess of 20 points (2% of the grade).

Grades will be assigned as following

A = 90%-100%; B = 80%-89%; C = 70%-79%; D = 60%-69%; less than 60% = F

Exams

There will be a midterm in-class exam and a comprehensive take final exam, which may include in-class and/or take-home portions. The in-class exams will be closed book, closed notes and may contain problems, essay questions and/or multiple-choice questions. The take home part may include essay question and/or machine learning problems in Python and Tensorflow. The list of permissible resources for the take-home portion of the exam will be announced by the instructor. You are not allowed to provide or accept any help on exam (in-class or take-home from other individuals. Doing so would constitute a violation of academic integrity policy. No make-up exams will be given with the exception of cases of documented medical or family emergency.

Homework

There will be 10 homework assignments, of which eight (8) with the highest score will count towards your grade. Some of the assignments will be technical in nature and include installation and configuration of SW, programming, and the use of deep learning tools. Some other assignments will be managerial in nature and include case study analysis, market research and reading-based assignments.

Group Project

As a part of the class, you will work on a term project in a two-person team. Individual project work may be allowed by the instructor on an exception basis. You can select from two options: a **technical** and a **managerial**. You will need to submit a final report and make a 7-10 min Youtube presentation video, which will be rated by all students in class, as well as the instructor. Students with the highest-rated videos will be given a chance to present their projects in class for an extra credit.

Technical option is designed for students who are interested in developing expertise related to a specific technical environment. As a part of the project, you will need to develop a prototype of an application that incorporates AI capabilities from one of the third-party platforms discussed in class. You will also need to create a report discussing the business or consumer need addressed by the application, application functionality and the AI capabilities incorporated, and include technical documentation of the application (SW and HW specification, source code with comments, etc.).

Managerial option is designed for students who are interested in gaining a deeper understanding of managerial and societal implications of AI. As a part of the project, the students will be asked to write a white paper on a specific set of challenges or opportunities related to AI. The paper should be sufficiently focused to allow for in-depth analysis of the problem and the development of concrete solution options. For example, instead of writing about opportunism or challenges afforded by of self-driving cars in general, one may address a specific issue of ownership of data collected by such cars, or a comparative review of current regulations regarding self-driving cars and their implications for the adoption of such cars.

In-class participation

The grade for class participation will be assessed based on students' participation in class discussions, completion of in-class assignments and quizzes. Specifically, each class certain students will be assigned to present a section of an EGAI book chapter scheduled for that week and to lead the discussion on the related topic. The grade will be assigned in a holistic manner and will take into account the quality as well as the frequency of participation.

OTHER POLICIES AND PROCEDURES

Late Submission Policy

All assignments are during the class on the due date. For some assignments, late submissions may be accepted for 50% credit if submitted within 2 weeks of the due date (requires consent of the instructor, individual assignments only).

In Case of Campus Closure

Should UNT close campus, it is your responsibility to keep checking your official UNT e-mail account (EagleConnect), as well as class Web site and Blackboard to learn about modifications to class activities, assignments and schedule, if any.

Use of Electronic Devices

Electronic devices should be used in class only when directed by the instructor and only for course related purposes. At all other times, electronic devices should be switched off/silenced and removed from the desk.

Acceptable Student Behavior

Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Center for Student Rights and Responsibilities to consider whether the student's conduct violated the Code of Student Conduct. The university's expectations for student conduct apply to all instructional forums, including university and electronic classroom, labs, discussion groups, field trips, etc. The Code of Student Conduct can be found at www.unt.edu/csrr

Code of Conduct and Ethics

This course adheres to the UNT policy on academic integrity. The policy can be found at <http://vpaa.unt.edu/academic-integrity.htm>.

Teaching Evaluations

Evaluation of the instructor's teaching effectiveness by the students is a requirement for all organized classes at UNT. At the end of the semester/session there will be a short Web-based survey, providing you a chance to comment on how this class is taught. I am very interested in the feedback I get from students, as I work to continually improve my teaching. I consider your participation as an important part of in this class.

Students with Disabilities

The College of Business Administration complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disability. If you have an established disability as defined in the Americans with Disabilities Act and would like to request accommodation, please see your instructor as soon as possible.

TENTATIVE COURSE SCHEDULE

The topics and dates as outlined in the course schedule are subject to change. All necessary changes will be announced and discussed in class in advance. You are responsible for making sure you are aware of any such changes.

Date	Subjects covered	Reading	Deliverables
30-Aug	Course information The promise of AI Tutorial: Installing Python and Tensorflow	EGAI Ch.1	
6-Sept	History and foundations of AI field Defining of an intelligent agent Tutorial: Intro to Python	EGAI Ch.2	HW1 – Python/TF installation
13-Sept	No class. Watch assigned videos. Take a quiz on Blackboard by 10 PM.	TFDL Ch.1-3, 5	
20-Sept	Technical foundations of AI. The fundamentals of machine learning. Defining loss functions. Gradient descent. Tutorial: Data manipulation with Python, introduction to tensors and tensor manipulations	TFDL Ch.1-3, 5	HW 2 – Python Code Academy Python modules complete
27-Sept	AI capabilities framework, Associated Technologies Machine learning with linear and logistic regression. Understanding loss functions. Tutorial: Linear and logistic regression with Tensorflow.	EGAI Ch.3,4 TFDL Ch.3	HW 3 – Data manipulation in Python, simple calculations and tensor manipulations with Tensorflow
4-Oct	AI in Action, AI business cases Introduction to neural networks and DNN. Tutorial: Using Tensorflow to train a perceptron neural network and a fully connected DNN. Review for the midterm	EGAI Ch.5 TFDL Ch.4-5	HW 4 – Linear and logistic regression with Tensorflow Project ID is due
11-Oct	MIDTERM EXAM	All readings to date	HW 5 – Case study/article review presentation 1
18-Oct	Starting the AI Journey Business applications 1: Image/video recognition, speech recognition and NLU Introduction to CNN Tutorial: Using pre-trained CNN model for image recognition.	EGAI Ch.6 TFDL Ch.6	HW 6 – Market research
25-Oct	AI prototyping Business applications 2: Expert advice and knowledge work Tutorial: Using RNN for stock price prediction	EGAI Ch.7 TFDL Ch.7	HW 7 – Training perceptron and DNN

TENTATIVE COURSE SCHEDULE (cont'd)

Date	Subjects covered	Reading	Deliverables
1-Nov	Industrializing AI Business applications 3: Robotics and transportation	EGAI Ch.9	HW 8 – Image recognition with CNN
8-Nov	What can go wrong? Ethical and governance issues 1: Challenges	EGAI Ch.8	HW 9 – Stock price change prediction with RNN
15-Nov	What's next for AI? Ethical and governance issues 2: Regulatory frameworks Reinforcement learning	EGAI Ch.10 TFDL Ch.8, 10	
22-Nov	NO CLASS – Thanksgiving		
29-Nov	TBD		HW10 - Case study/article review presentation 1
6-Dec	Project Presentations. Final exam review		Final reports due.
13-Dec	FINAL EXAM (Take home, due by 6:30 PM on Dec. 13)		