WENTWORTH INSTITUTE OF TECHNOLOGY

College of Engineering and Technology

IMPACT OF AI ON SOCIETY

Spring 2019

**Course Number:** COMP3800 - 06

**Class Schedule:** Lecture and lab: 5:00 pm – 8:50 pm Tuesday

**Instructor Name:** Armen Pischdotchian

**Class Location:** Annex Central 102

**Telephone Number**: (617) 699 6532

**Appointments and Meetings:** Office Hours by Appointment. Let’s use [Slack](https://join.slack.com/t/impactofai/shared_invite/enQtNTE2MzQxNDg4MjczLTczNTQ1NDFmZDU4NzA0NmE3ODE0MTAyMjM4YmQxNGQyYjBhZjhmY2Q1OTYxM2JmNTc4MjlhOWUxZTFlY2ZlZmI)

**Email address:** pischdotchiana@wit.edu

**Credits/Hours:** 4 (Lecture/Lab/Total credits)

**COURSE DESCRIPTION**

This course is designed to introduce you to the concepts and methodologies of artificial intelligence (AI) and data science as the two fields begin to merge where you need machine learning (a subset of AI) to extract insights from both structured (csv, Excel) and unstructured (images, text, etc.) data.

**COURSE PREREQUISITES**

* Undergraduate level [COMP 1000](https://prodweb2.wit.edu/SSBPROD/bwckctlg.p_display_courses?term_in=202010&one_subj=COMP&sel_subj=&sel_crse_strt=1000&sel_crse_end=1000&sel_levl=&sel_schd=&sel_coll=&sel_divs=&sel_dept=&sel_attr=) Minimum Grade of TR or Undergraduate level [ELEC 3150](https://prodweb2.wit.edu/SSBPROD/bwckctlg.p_display_courses?term_in=202010&one_subj=ELEC&sel_subj=&sel_crse_strt=3150&sel_crse_end=3150&sel_levl=&sel_schd=&sel_coll=&sel_divs=&sel_dept=&sel_attr=) Minimum Grade of TR and Undergraduate level [MATH 1030](https://prodweb2.wit.edu/SSBPROD/bwckctlg.p_display_courses?term_in=202010&one_subj=MATH&sel_subj=&sel_crse_strt=1030&sel_crse_end=1030&sel_levl=&sel_schd=&sel_coll=&sel_divs=&sel_dept=&sel_attr=) Minimum Grade of TR or Undergraduate level [MATH 2100](https://prodweb2.wit.edu/SSBPROD/bwckctlg.p_display_courses?term_in=202010&one_subj=MATH&sel_subj=&sel_crse_strt=2100&sel_crse_end=2100&sel_levl=&sel_schd=&sel_coll=&sel_divs=&sel_dept=&sel_attr=) Minimum Grade of TR. All pre-reqs are strongly encouraged but not required.

**REQUIRED TEXTBOOK**

[Prediction Machines](https://www.amazon.com/Prediction-Machines-Economics-Artificial-Intelligence/dp/1633695670/ref=sr_1_2?keywords=prediction+machines&qid=1566498199&s=books&sr=1-2)

**COURSE LEARNING OUTCOMES**

At the completion of this course, students should be able to:

* Explain how AI systems understand vision and language
* Build a face recognition app using Node-RED (all code is provided)
* Build a virtual agent using Natural Language Processing techniques
* Gain an awareness of the ethics and bias of AI implementation
* Explore what it takes to be a data scientist
* Perform data analytics and build machine learning models
* Obtain a [Design Thinking](https://www.ibm.com/design/thinking/page/badges/core-skills) badge.
* Obtain a Data Science badge from [Cognitiveclass.ai](https://cognitiveclass.ai/courses/data-science-101/)

**INSTRUCTIONAL METHODOLOGIES**

This course explores interactive lecturing via Node-RED visual coding and Jupyter Notebooks with hands-on assignments that reinforce the lecture material. In particular, lectures will focus on concepts and ideas while the assignments will provide concrete experience and skills. There is no requirement to be code savvy in this class. All code, if any, is provided for copy/paste or merely edit purposes.

**ATTENDANCE POLICY**

Students are expected to attend classes regularly, take tests, and submit papers and other work at the times specified by the instructor. Students who are absent repeatedly from class or studio will be evaluated by faculty responsible for the course to ascertain their ability to achieve the course objectives and to continue in the course.  Instructors may include, as part of the semester's grades, marks for the quality and quantity of the student's participation in class. At the discretion of the instructor, a student who misses 15 percent of class may be withdrawn from the course by the instructor. A grade of WA will appear on the student’s official transcript as a result.

**GRADING POLICY**

There will be multiple lab and presentation assignments during the semester. Assignments will involve number Each assignment will include a detailed description of the problems and expectations for successful completion.

There will also be 3 quizzes/exams during the semester. There is no final exam for this course. Rather, students will complete a final project that will consist of implementing AI or data science solution of their choice. The project assignment will include a detailed description of the project expectations for successful completion. The requirement will be announced in the class.

Student grades are based upon the following criteria:

|  |  |
| --- | --- |
| In-class presentations of customized labs | 50% |
| In-class presentation of assigned readings | 20% |
| URL submissions of your customized apps and related social media accounts | 25% |
| Participation | 5% |

# WENTWORTH GRADING SYSTEM:

| **Grade** | **Weight** | **Numerical Definition** | **Definition** |
| --- | --- | --- | --- |
| A A- | 4 3.67 | 93-100 90-92 | Student learning and accomplishment far exceeds published objectives for the course/test/assignment and student work is distinguished consistently by its high level of competency and/or innovation. |
| B+ B B- | 3.33 3 2.67 | 87-89 83-86 80-82 | Student learning and accomplishment goes beyond what is expected in the published objectives for the course/test/assignment and student work is frequently characterized by its special depth of understanding, development, and/or innovative experimentation. |
| C+ C C- | 2.33 2 1.67 | 77-79 73-76 70-72 | Student learning and accomplishment meets all published objectives for the course/test/assignment and student work demonstrates the expected level of understanding and application of concepts introduced. |
| D+ D | 1.33 1 | 67-69 60-66 | Student learning and accomplishment based on the published objectives for the course/test/assignment were met with minimum passing achievement. |
| F | 0 | 0-59 | Student learning and accomplishment based on the published objectives for the course/test/assignment were not sufficiently addressed or met. |

**DROP/ADD**

Students should check the academic calendar to confirm the add/drop deadline. Dropping and/or adding courses is done online. Courses dropped in this period are removed from the student’s record.

Non-attendance does not constitute dropping a course. If a student has registered for a course and subsequently withdraws or receives a failing grade in its prerequisite, **then the student must drop that course**. In some cases, the student will be dropped from that course by the Registrar. However, it is the student’s responsibility to make sure that he or she meets the course prerequisites and to drop a course if the student has not successfully completed the prerequisite. The student must see his or her academic advisor or academic department chair for schedule revision and to discuss the impact of the failed or withdrawn course on the student’s degree status.

**MAKE-UP POLICY**

Due to the nature of this project-based course, all submissions and presentations must be completed on time. Any late deliverables will be assigned a grade of zero.

**ACADEMIC SUPPORT**

The Center for Academic Excellence facilitates Wentworth students’ academic success and helps them to achieve their full learning potential. Students may choose to receive individual assistance through one-on-one tutoring in many subjects, including math, science, writing, and major classes. In addition, the Center for Academic Excellence offers Facilitated Study Groups (FSGs), tutor-led study tables, academic workshops, and learning-strategy consultations. The peer-tutoring program is certified by the College Reading and Learning Association’s International Tutor Training Certification program.   
To make an appointment or to review their drop-in offerings, please visit <http://www.wit.edu/cae>.   
For additional assistance or support on subjects not listed, please reach out via email at [cae@wit.edu](mailto:cae@wit.edu).

**ACADEMIC HONESTY STATEMENT:**

Students at Wentworth are expected to be honest and forthright in their academic endeavors. Academic dishonesty includes but is not limited to cheating, prohibited collaboration, coercion, inventing false information or citations, plagiarism, tampering with computers, destroying other people's coursework or lab or studio property, theft of course materials, posting coursework/course materials to websites, or other academic misconduct. If you have any questions, contact your professor prior to submitting an assignment for evaluation. See your academic catalogue for a full list of definitions and the WIT Academic Honesty website for the procedures: wit.edu/academic-honesty.

**STUDENT ACCOUNTABILITY STATEMENT:**

Behavior unbecoming a student is any violation of a published Wentworth policy in an academic environment, and/or any behavior that individual faculty or staff determines is unacceptable in his or her classroom, laboratory, or other academic area or function. Behavior unbecoming a student in an academic environment will not be tolerated. Violations of behavioral expectations may be forwarded to the Office of Community Standards for disciplinary action.

Wentworth takes violations of academic dishonesty and misconduct very seriously. Sanctions for such violations include, but are not limited to, a grade of “F”, removal from a course, Institute suspension, or Institute expulsion.

**WELLNESS AND DISABILITY SERVICES:**

College can be challenging and it is common to feel overwhelmed or stressed at times. If these feelings are related to course work or academic performance, please talk to me. For more significant mental health concerns, the **Center for Wellness and Disability Services (003 Watson Hall, 617-989-4390)** provides free and confidential mental health counseling.

If you or someone you know needs support around thoughts of suicide, the following resources are available:

* Center for Wellness and Disability Services, Watson 003, 617-989-4390, M-F 8:15-4:45
* Campus Police, First level of 610 Huntington Avenue, 617-989-4444, 24/7
* Samaritans, call or text 1-877-870-4673
* Crisis Text Line, text “start” to 741-741
* National Suicide Prevention Lifeline, call 1-800-273-8255
* GLBT Youth Hotline, call 1-866-488-7386
* Beth Israel Deaconess Emergency Room, 190 Pilgrim Rd Boston, MA

Students requiring academic accommodations must provide an official accommodation memo from the **Center for Wellness and Disability Services** and contact me privately to discuss logistics.

**COLLEGE OF THE FENWAY STUDENTS:**

If you are enrolled in this course through COF Cross Registration, notify your course instructor. Please provide her/him with your email address to be sure that you receive course information in a timely way. You should also discuss how to access online applications that might be used in the course.

**WEEKLY SCHEDULE**

A tentative schedule is provided below. The schedule is subject to change as the semester progresses.

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Lecture | Lab | Assignment (due the following session or as an in-class presentation) |
| 1 | An introduction to cognitive systems | * Obtain IBM Cloud | Register/create the following accounts: [Github](https://github.com/), [Medium](https://medium.com/) and [LinkedIn](https://www.linkedin.com/feed/)  Read [Prediction Machines](https://www.amazon.com/Prediction-Machines-Economics-Artificial-Intelligence/dp/1633695670/ref=sr_1_2?keywords=prediction+machines&qid=1566498199&s=books&sr=1-2) (MA) Chapter 1 and 2 |
| 2 | How does an AI system see; the Vision approach | * Provision Node-RED service and * [Build face reco app](https://github.com/apischdo/Artificial-Intelligence-and-Data-Science/blob/master/Face_Recognition_WIT.doc) * [Live Earthquakes](https://github.com/apischdo/Artificial-Intelligence-and-Data-Science/blob/master/Earthquake_WIT.doc) * [ISS Orbit](https://github.com/apischdo/Artificial-Intelligence-and-Data-Science/blob/master/ISS.json) | Update the spreadsheet with your Github, Medium, and LinkedIn links:  Read Chapters 3,4,5 |
| 3 | Understanding language | [Build a chatbot](https://github.com/apischdo/Artificial-Intelligence-and-Data-Science/blob/master/Conversational%20AI.pdf)  [Gaining Insights from AirBnb reviews](https://github.com/apischdo/Artificial-Intelligence-and-Data-Science/blob/master/Gaining%20Insights%20from%20AirBnB%20reviews.docx)  [Got translate will travel](https://github.com/apischdo/Artificial-Intelligence-and-Data-Science/blob/master/Got%20Translate%20Will%20Travel.docx)  *Prof explains following week’s assignment* | Read Chapter 6 |
| 4 | 5 min Presentations | Insights from readings plus how any of the vision or language services can be helpful | Write 1-page summary and post to Medium |
| 5 | Presentations continued | Decision tree classifier | Read Chapter 7  Build your own Decision tree classifier |
| 6 | Instructor traveling | Watch all of the videos:  <https://youtu.be/H3P87qCdqk4>  <https://youtu.be/Krqy-Eso3a8>  <https://youtu.be/E0uehCrPMlU> | Watch video  Read chapter 8 and 9 |
| 7 | In-class quiz on video and readings |  | Read Chapters 10 and 11 |
| 8 | About Data Science (DS)  Demo Watson Studio | Provision Watson Studio  [Visualize Article Sentiment lab](https://github.com/apischdo/Artificial-Intelligence-and-Data-Science/blob/master/Visualize%20Article%20Sentiment.docx) | Read Chapters 12, 13 and 14 |
| 9 | Data Science labs | * Provision Watson Studio * [Data Wrangling lab](https://github.com/apischdo/Artificial-Intelligence-and-Data-Science/blob/master/Data%20Wrangling.pdf) * [Data Wrangling in Python](https://github.com/apischdo/Artificial-Intelligence-and-Data-Science/blob/master/Data%20Wrangling%20in%20Python.pdf) | Read chapters 15, 16 |
| 10 | More Data Science labs | * Employees Attrition * Heart Failure Rate | Read Chapter 17, 18 and 19 |
| 11 | [Data Science 101 badge](https://cognitiveclass.ai/courses/data-science-101) | Complete the course in class |  |
| 12 | [Design Thinking badge](https://www.ibm.com/design/thinking/page/badges/core-skills) | Complete the course in class | You must obtain both badges, either while in class or afterwards |
| 13 | Final presentation | Done in class |  |
| 14 | Final presentations | Done in class |  |
| 15 | Final Group Project | Final Group Project |  |