MATH 3550 – Programming for Actuaries ~ *Fall 2026*

Three credits *3:30 to 4:45 PM ~ Tuesdays and Thursdays ~ MONT 421*

Instructor

Dan Watt, FCAS

Email: *daniel.watt@uconn.edu*

Please utilize our **Teams** channel for questions. *A link to the Teams channel is located on HuskyCT.* Either myself and/or other students can answer, which will allow everyone to see and share questions, answers, and ideas across the semester.

If you would like to meet separately…
My office hours *(MONT 206)***:**

- In-person: Tuesdays and Thursdays from 10:50–11:50am, 1:50–3:25pm, & 4:50–5:15pm
- Nexus link provided in HuskyCT to sign up for a time
- Please let me know if these times don't work for you

We will be using our Teams channel a lot this semester!

Course Objectives

To provide effective insight, actuaries need to gather, organize, and analyze data, and present indicated insight to our business partners. To do so efficiently, we need to have certain software and coding skills. This course will provide an introductory view into designing, developing, testing, and implementation of programs to solve actuarial problems using SQL, AI, R, Python, Excel, and VBA.

Upon completion of this course, students will be able to:

- Navigate and understand data systems
- Read and troubleshoot SQL code
- Use and understand generative AI for administrative, coding, and research purposes
- Read and troubleshoot R code and be able to navigate Posit Studio (RStudio)
- Read and troubleshoot Python code and be able to navigate Jupyter Notebook
- Use Excel comfortably, hopefully at an intermediate level
- Better create slides and prepare for presentations
- Become more comfortable communicating and presenting technical topics
- Become comfortable in the Teams meeting environment

We will successfully accomplish these objectives only if we work together. My role will be to provide a forum for the review and discussion of these topics and ultimately to test your understanding of the materials. In turn, you will be expected to prepare for each class, going through the assigned modules thoughtfully and any supplemental materials, and to participate actively in the classroom discussions. **An actuary is so much more than a number-cruncher!**

Course Expectations

The objectives for this course were carefully selected to prepare you for subsequent internship(s) and entry-level positions. As such, it is VITAL that you learn and become comfortable with every topic. To facilitate your learning, I have designed this course to be more Socratic in nature than you may be used to. This is on purpose, to ensure you walk away from the semester better prepared for the next steps in your career. As such, I suggest expecting this course to be a good amount of work on your part, since coding/technology skills come best through practice.

You will be required to do the following:

- Complete codecademy.com modules:

  For all topics this semester besides Excel/VBA, we will be practicing a mostly inverted classroom format. You will be required to self-study assigned modules from the codecademy.com website, along with any desired additional research and practice.

  Screenshots of completed modules are to be uploaded in HuskyCT by their respective due dates. See the course schedule and due dates in HuskyCT for further information.

  We will have follow-up classroom discussions, where you will be expected to participate and solidify your learned concepts by teaching each other and sharing insights.

- Prepare slides and presentations for classroom discussions:

  For all topics this semester, (including Excel/VBA) you will be required to prepare slides to present in class on given topics. You are to prepare at least one slide per listed topic, keeping in mind that you will present for 3-5 minutes on each. The list of topics for each unit can be found in the Assignments section of HuskyCT. The slides will be due in HuskyCT by their respected due dates. If your intention for some topics is to perform a live demo, you may simply list on the slide “live demo”.

  You are required to build your slides using Microsoft PowerPoint. As a UConn student, you have access to Microsoft 365, which includes PowerPoint. My goal is prepare you for the real-world work experience. Thus, we will use Microsoft products for this course.

- Present twice in classroom discussions:

  You will be required to present two times this semester during classroom discussions. Please refer to the course schedule to identify the student presentation days. I will be randomly selecting students to present day-of. As such, you need to come to each class fully prepared to present 3-5 minutes on each topic.
  Even I don’t know when you will be selected…

  You will be given one “free pass” for the semester. This can either be used implicitly because your name is drawn and you are not in class or explicitly because you are in class when your name is drawn, but choose to use your free pass for that topic.
  Please note that your free pass is for the respective topic, not for the full day - your name will be placed back in the pot, so there does exist some probability that you may be

selected to present a different topic for the same day. As such, you should be prepared to present on all topics. You need to be practiced and polished before coming to class on every listed concept, whether or not you are selected to present.

You will be presenting by sharing your screen in Teams. This is good practice for real-world work meetings. As such, come to class with your slides open on your laptop/tablet and be prepared to join the meeting and share your screen in Teams.

Why am I making you do this? As an actuary, you will be preparing and presenting over and over and over. You MUST get used to this and become really good at it! You will also regularly be called upon in meetings, even if you are not originally on the agenda. You need to get used to coming to every meeting prepared to answer questions, give background, provide insight, and sometimes walkthrough concepts. Also, specifically for this semester, I am determined to ensure that each one of you are ready for your internships and entry-level positions! There is no better way to learn and know your stuff than to prepare to teach the concepts to others. Essentially, I am forcing you to learn!

- Exams & Excel Group Project:

  We will have one exam on SQL/AI, one on R, one on Python, and a Final Exam.

  For our Excel unit, we will not have an exam, but will have a group project. In this project, your group will analyze a dataset in Excel using the techniques covered in the Excel unit. You will be assigned teams of three or four. There are two parts of this project: the final Excel report and the project presentation. For full instructions and further information, please review the "Group Project" folder in HuskyCT.

  Why am I making you do a group project? As an actuary, you will constantly work in teams, particularly in teams consisting of folks from all different backgrounds and skill levels. You must practice working in teams efficiently, thoughtfully, and fairly.

Grading for the Course

Your grade for this class will be based on the following weightings:

10% Module Completion Screenshots *(6 sets)**

25% Presentation Slides *(12 sets ~ see below for weights)*

15% Two In-Class Presentations *(7.5% each)*

10% Exam 1 ~ SQL/AI

10% Exam 2 ~ R

10% Exam 3 ~ Python

10% Excel Group Project *(9% project / 1% eval)*

10% Comprehensive Final Exam

A	= 93.3 – 100
A-	= 90.0 – 93.2
B+	= 86.7 – 89.9
B	= 83.3 – 86.6
B-	= 80.0 – 83.2
C+	= 76.7 – 79.9
C	= 73.3 – 76.6
C-	= 70.0 – 73.2
D+	= 66.7 – 69.9
D	= 63.3 – 66.6
D-	= 60.0 – 63.2
F	= < 60

** Module completion weights are based on estimated module times:*

SQL	*AI*	*R part 1*	*R part 2*	*Python part 1*	*Python part 2*	*Excel part 1*	*Excel part 2*	*Excel part 3*	*Excel part 4*	*Excel part 5*	*Excel part 6*
1.9%	*1.4%*	*1.9%*	*1.2%*	*1.8%*	*2.3%*	*2.0%*	*2.3%*	*2.6%*	*2.5%*	*2.5%*	*2.6%*

Grades will be unrounded all semester long and then your final grade will be rounded to the tenth. Your letter grade will be given according to the table above.

Required Materials

- You should have Office 365, which is free for UConn students. You will be working a lot in PowerPoint, Teams, and Excel this semester:
  http://software.uconn.edu/microsoft-products-students/

- For most of the semester, you will be studying modules at codecademy.com. You are only expected to have the free membership and do the free modules. While you are welcome to become a paying member, it is not expected for this class.

- R and RStudio will need to be downloaded onto your computer:
  To install R:
  - Go to the official CRAN Website.
  - Click Download R for Windows or Download R for Mac depending on your laptop's operating system.
  - Click the link for the base subdirectory (or "install R for the first time") to download the installer file (.exe for Windows or .pkg for Mac).
  - Open the downloaded file and click through the setup wizard using the default settings.

  To install RStudio:
  - Go to the official Posit Downloads Page to get RStudio Desktop.
  - Scroll to the free RStudio Desktop installer option and click download for your operating system.
  - Open the downloaded installer file once the download finishes.
  - Follow the setup instructions on your screen, accepting the default folder and settings.
  - Click Finish when the installation is done.
  - Search for RStudio in your laptop's search bar or start menu.
  - Use the 64-bit version.
  - Click the app icon to launch it. It will automatically connect to the R software you installed.
  - I suggest you pin RStudio to your taskbar, so it is easier to access.

- Python and Jupyter Notebook will need to be downloaded onto your computer:
  - Download and install Anaconda *(you can skip registration)*:
    https://www.anaconda.com/download/success?reg=skipped
  - Go to the Anaconda Download Page and download the installer for your operating system (Windows, Mac, or Linux).
  - Run the downloaded installer file and follow the setup prompts on your screen. Keep the recommended default settings during installation. *(FYI…this takes a while)*
  - Once finished, open your system's Start Menu (Windows) or Spotlight/Applications (Mac) and launch Anaconda Navigator or Anaconda Prompt.
  - In Anaconda Navigator, find Jupyter Notebook and click Launch. If using the Anaconda Prompt, type jupyter notebook and press Enter.
    (FYI…this takes a few minutes the first time)
  - I suggest creating a bookmark in your browser, so it is easier to access.

Helpful, but Not Required Materials

- To help with practicing SQL, a helpful online tool lives here:
  https://www.sqlpractice.in/?set=practice

- Codecademy.com has several other helpful modules for extra learning.
  Other helpful sites:
  w3schools
  datacamp
  and obviously… YouTube, reddit, stack overflow, and AI (with validation)

Appeal Process

If you feel that an answer you provided deserved more points than it was awarded, simply send an e-mail within two class days of when the grades were released. Your appeal must include the following:

1. Note which item(s) you are concerned with and what you answered.
2. Justify why your answer warrants more points, using reference materials from the class, information from other classes or other reliable sources.
3. Tell me how many points you think your answer deserves; what you think is fair.

Note: This process is similar to the process used for appeals on CAS examinations. Successful appeals typically have the following characteristics:

- Cite references in the Syllabus for an alternative answer
- Explain fully an alternative answer including alternative solution for a numerical question
- Point out an error in the answer key for the short-answer questions and the reasoning for an alternative correct answer.

I will consider each appeal that is sent and let you know what I think is fair. We can talk in person if you are not satisfied with the outcome.

Code of Conduct

All of you aspire to become actuaries. As actuaries - and even as candidates - you agree to live by a Code of Professional Conduct. This code governs your work as actuaries, but also outlines your responsibilities to the profession and to the public.

Precept 1 of the Code is entitled Professional Integrity. It states: "An actuary shall act honestly, with integrity and competence, and in a manner to fulfill the profession's responsibility to the public and to uphold the reputation of the actuarial profession."

Precept 13 of the Code is entitled Violations of the Code of Professional Conduct. It states: "An Actuary with knowledge of an apparent, unresolved, material violation of the Code by another Actuary should consider discussing the situation with the other Actuary and attempt to resolve the apparent violation. If such discussion is not attempted or is unsuccessful, the Actuary shall disclose such violation to the appropriate counseling and discipline body of the profession….".

The Code of Professional Conduct encompasses my expectations for how you will behave in this class. I will expect that each of you act honestly - and with integrity – in all facets of this class (including but not limited to exams and quizzes). As Precept 13 relates to this class, any student who suspects or observes cheating by another student (an apparent violation of the Code) is expected to disclose such apparent violation.

https://policy.uconn.edu/2023/07/11/academic-scholarly-and-professional-integrity-and-misconduct-aspim-policy-on/

Use of AI

AI programs are not a replacement for your human creativity, originality, and critical thinking. Writing, thinking, and researching are crafts that you must develop over time to become a successful actuary. At the same time, you should learn how to use AI and in what instances AI can be helpful to you. If you use it, cite it in your work (e.g. "ChatGPT, personal communication, MM/DD/YYYY"), to stay within university policies on academic honesty. You are responsible to make sure that any content is accurate and says what you want it to say. No more than 25% of student work in this course should be generated by AI.

Please remember:

- Don't accept anything AI generates at face value without checking it critically. AI may provide completely erroneous responses, called AI hallucination. As such, every response should be carefully vetted for accuracy and validity.
- Practice and improve your AI prompting skills. As you first get started, don't rely on your initial prompts without deep validation. It will take a while to learn the art of prompting and may take several refining prompts to get the proper results.
- As with anything online, be safe and smart when using AI, being extra careful of the information you feed it.

The use of generative AI tools (e.g., ChatGPT, Google Bard, Microsoft Copilot, etc.) is permitted in this course for the following activities:

- Brainstorming and refining your ideas.
- Helping write starter code to be adjusted and validated.
- Studying further on particular topics, after referencing class notes, slides, and the text.
- Finding information on a particular topic.
- Drafting an outline to organize your thoughts.
- Checking grammar and style.

The use of generative AI tools is NOT permitted in this course for the following activities:

- Impersonating you in classroom contexts, such as by using the tool to compose responses to assignments, exams, and/or the group project.
- Writing sentences, paragraphs, etc. to complete assignments greater than 25% of the total content.

You are responsible for the information you submit based on an AI query (i.e. that it does not violate intellectual property laws, or contains misinformation or unethical content).

If any part of this is confusing or uncertain, please reach out to me for a conversation before submitting your work.