COT 5570 – 0M01: Introductory Mathematics for Modeling and Simulation

Dept. of Modeling & Simulation
3 units

Course Syllabus 10/16/18

Instructor: Alan Paris, Ph.D.  Semester: Fall 2018

Office Location: Partnership 3, Rm. 115  Class Meeting Days: Tu Th

Office Hours: Tu Th 4:30 – 6:30  Class Meeting Time: 3:00 – 4:20

Dept. Phone: (407) 882-1407  Class Location: Partnership 3, Rm. 233

Email: atparis@knights.ucf.edu or through Webcourses  Course Modality: M

Course Description

From the Catalog: Preparatory analytical survey of material for the M&S core Math Foundations course: algebra, discrete mathematics, and basic probability.

The field of Modeling & Simulation creates applications for situations that are too large, complex, unpredictable, unrepeatable, unethical, or dangerous to allow direct investigation. Examples include human-machine interactions, virtual reality training, massive multi-player gaming, weather prediction, war games, global trading, and whole-organism biology. Understanding such a system requires a conceptual abstraction (the model) with a physical embodiment, such as in a large computer or virtual trainer, whose dynamics can be observed (the simulations) and characterized statistically.

This course prepares students by introducing the theoretical and practical skills required for success in M & S. These skills will be developed in more depth by the M & S core course Mathematical Foundations of Modeling & Simulation.

Topics from several key mathematical disciplines will be discussed at a conceptual level. Because the skills of computer programming and public presentation of technical information are essential for success in M & S, confidence will be gained through weekly homework assignments, including simple programs in the computer language Python 3.x, followed by rotating student presentations of homework solutions.

New material will be introduced during the first class of the week which students will be required to attend. The second class of the week, for which attendance is optional (though highly recommended), will combine additional material with a hands-on homework laboratory. Course documentation will consist of files and videos uploaded to Webcourses as well as links to several external tutorial sites which have proven useful.

Student Learning Outcomes

By the end of the course, students will be proficient Python programmers, confident presenters of technical information, and familiar with many of the most important mathematical concepts underlying Modeling & Simulation applications. They will be ready for the more advanced Mathematical Foundations of Modeling & Simulation and for success in their M & S careers.
Course Activities

It is assumed that each student has an individual laptop. (If the student cannot afford a laptop, please let me know confidentially and I will provide one to use for the semester.)

The first non-exam class of each week will begin with a student presentation of a solution to the previous week’s homework followed by a brief class discussion of other possible solutions. It will be very helpful for students to bring their laptops to class, especially during the first week as we install Python.

It is expected that students’ will spend considerable time outside of the classroom working through some of the many online Python programming tutorials to which they will be directed. These could include Python's native 3.x tutorials (https://www.python.org/doc/), those available to UCF students through Lynda (http://lyndacampus.aa.ucf.edu/), as well as the “Python Bootcamp” tutorials developed by the M & S department available through the COT 5570 Webcourses interface.

There will be several mathematically-oriented Python programming assignments consisting of one or more modules which will be tested for correct execution. Also, there will be written problem sets. At the time of homework assignment, one student will be assigned the task of presenting a solution to the class the following week. Students can expect to present at least twice during the semester.

Students can work together if they choose but they must submit work individually. However, long experience has proven that, as with a human language, mathematical computer programming is a skill that cannot be learned by watching someone else do it. Students are strongly encouraged to use publicly-available online resources. However, any other outside assistance requires my permission ahead of time or the assignment will be given a grade of 0.

There will be two in-class exams and an in-class final. The exams will be administered using Webcourses and will require the use of the students’ laptop. The exams may have both conceptual and programming sections.

Important Dates

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>First class</td>
<td>8/21/18</td>
<td></td>
</tr>
<tr>
<td>Exam 1</td>
<td>10/2/18</td>
<td>3:00-4:20 pm</td>
</tr>
<tr>
<td>Exam 2</td>
<td>10/TBD /18</td>
<td>3:00-4:20 pm</td>
</tr>
<tr>
<td>Withdrawal deadline</td>
<td>10/26/18</td>
<td></td>
</tr>
<tr>
<td>Thanksgiving (no class)</td>
<td>11/22/18</td>
<td></td>
</tr>
<tr>
<td>Last class</td>
<td>11/29/18</td>
<td></td>
</tr>
<tr>
<td>Final exam</td>
<td>12/ 6/18</td>
<td>1:00-3:50 pm</td>
</tr>
</tbody>
</table>

Assignment Submission

All assignments should be uploaded using the Webcourses interface. Programming assignments should be uploaded as .py files. Written assignments should be uploaded as .pdfs. Screenshots and other images should be in .pdf, .jpg, .png, or .bmp formats.

Assessment and Grading Procedures

Python assignments will be graded based on correct program execution at a rate of 10 points per assigned module.

Standards and suggestions for the written homework are as follows:

- Even if handwritten, the submission must be a professional quality product in which you can take pride.
- It is not difficult at all to learn to put characters such as $\in$ and $\subseteq$ into a Word document. It would be a very beneficial professional skill for your future: Math Unicode Lists.
• Positively, you need to ask yourself if you would hand this production to a client, a graduate committee, a journal, a conference, or a class that was important to you.

• Negatively, the standard is: If I can’t read it easily, I won’t grade it.

• Pencil scans very poorly. For all mathematics classes (not just COT 5570), you need to do your calculations on scratch paper using whatever writing instrument you want. But the final product must be a clean copy of your answers in pen or text software.

• Most of us have illegible handwriting. It is best to use block letters.

• Use plenty of white space in your clean copy. Don’t cram everything into single lines, crowded one on top of the other like bricks. I should be able to see all calculations and answers clearly separated from one another. If it takes 20 pages, that’s what it takes.

• If you just put down an answer it’s just right or wrong, period. If I don’t see your work or thought process, I can’t give you partial credit. More importantly, I can’t identify any misunderstandings you may have.

Assignment groups contribute to the final numerical grade using the following weights:

<table>
<thead>
<tr>
<th>Assignment Group</th>
<th>Weight</th>
<th>Points per Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Python Installation</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Python Programs</td>
<td>15%</td>
<td>10 points per Python module.</td>
</tr>
<tr>
<td>Written Homework</td>
<td>40%</td>
<td>10 points per written assignment.</td>
</tr>
<tr>
<td>Presentations</td>
<td>10%</td>
<td>10 points per presentation.</td>
</tr>
<tr>
<td>Exams</td>
<td>35%</td>
<td>10 points for Exams 1,2; 15 points for the Final.</td>
</tr>
</tbody>
</table>

Numerical grades $0\% \leq G\% \leq 100\%$ will converted to final letter grades according to the following table, with no additional rounding:

<table>
<thead>
<tr>
<th>Letter</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>$97 &lt; G \leq 100$</td>
</tr>
<tr>
<td>A</td>
<td>$94 &lt; G \leq 97$</td>
</tr>
<tr>
<td>A-</td>
<td>$90 &lt; G \leq 94$</td>
</tr>
<tr>
<td>B+</td>
<td>$87 &lt; G \leq 90$</td>
</tr>
<tr>
<td>B</td>
<td>$84 &lt; G \leq 87$</td>
</tr>
<tr>
<td>B-</td>
<td>$80 &lt; G \leq 84$</td>
</tr>
<tr>
<td>C+</td>
<td>$77 &lt; G \leq 80$</td>
</tr>
<tr>
<td>C</td>
<td>$74 &lt; G \leq 77$</td>
</tr>
<tr>
<td>C-</td>
<td>$70 &lt; G \leq 74$</td>
</tr>
<tr>
<td>D</td>
<td>$60 &lt; G \leq 70$</td>
</tr>
<tr>
<td>F</td>
<td>$G \leq 60$</td>
</tr>
</tbody>
</table>

Attendance

Mixed-mode courses require attendance for at least 50% of all classes. For COT 5570, attendance will be required for the first non-exam class in each week. However, attendance at all classes is strongly recommended. The roll will be taken in each class. UCF policy defines acceptable absences as:

“Reasons for acceptable absences may include illness, serious family emergencies, special curricular requirements (e.g., judging trips, field trips, professional conferences), military obligations, severe weather conditions, and religious holidays.”

Make-up exams and assignments for acceptable absences will be arranged as needed.

Grade Dissemination
To insure compliance with the **Family Educational Rights and Privacy Act (FERPA)**, grades will not be released to third parties and all course feedback will be provided through the COT 5570 Webcourses interface.

**Course Materials and Resources**

Course documentation and texts will be provided by files uploaded to Webcourses as well as external internet links. Students are strongly encouraged to familiarize themselves with available public resources, especially the Python built-in documentation, online tutorials, and forums, since these will continue to be basic programming tools for their future applications.

**UCF Policies**

**Academic Integrity**
The Center for Academic Integrity (CAI) defines academic integrity as a commitment, even in the face of adversity, to five fundamental values: honesty, trust, fairness, respect, and responsibility. From these values flow principles of behavior that enable academic communities to translate ideals into action.

[http://academicintegrity.org/](http://academicintegrity.org/)

**UCF Creed**: Integrity, scholarship, community, creativity, and excellence are the core values that guide our conduct, performance, and decisions.

1. Integrity: I will practice and defend academic and personal honesty.
2. Scholarship: I will cherish and honor learning as a fundamental purpose of my membership in the UCF community.
3. Community: I will promote an open and supportive campus environment by respecting the rights and contributions of every individual.
4. Creativity: I will use my talents to enrich the human experience.
5. Excellence: I will strive toward the highest standards of performance in any endeavor I undertake.

The following definitions of plagiarism and misuse of sources come from the Council of Writing Program Administrators [http://wpacouncil.org/node/9](http://wpacouncil.org/node/9) and have been adopted by UCF’s Department of Writing & Rhetoric.

**Plagiarism**
In an instructional setting, plagiarism occurs when a writer deliberately uses someone else’s language, ideas, or other original (not common-knowledge) material without acknowledging its source. This definition applies to texts published in print or on-line, to manuscripts, and to the work of other student writers.

**Misuse of Sources**
A student who attempts (even if clumsily) to identify and credit his or her source, but who misuses a specific citation format or incorrectly uses quotation marks or other forms of identifying material taken from other sources, has not plagiarized. Instead, such a student should be considered to have failed to cite and document sources appropriately.

**Responses to Academic Dishonesty, Plagiarism, or Cheating**
UCF faculty members have a responsibility for your education and the value of a UCF degree, and so seek to prevent unethical behavior and when necessary respond to infringements of academic integrity. Penalties can include a failing grade in an assignment or in the course, suspension or expulsion from the university, and/or a "Z Designation" on a student's official transcript indicating academic dishonesty, where the final grade for this course will be preceded by the letter Z. For more information about the Z Designation, see [http://goldenrule.sdes.ucf.edu/zgrade](http://goldenrule.sdes.ucf.edu/zgrade).


**Unauthorized Use of Class Materials**
There are many fraudulent websites claiming to offer study aids to students but are actually cheat sites. They encourage students to upload course materials, such as test questions, individual assignments, and examples of graded material. Such materials are the intellectual property of instructors, the university, or publishers and may not be distributed without prior authorization. Students who engage in such activity are in violation of academic conduct standards and may face penalties.
Unauthorized Use of Class Notes

Faculty have reported errors in class notes being sold by third parties, and the errors may be contributing to higher failure rates in some classes. The following is a statement appropriate for distribution to your classes or for inclusion on your syllabus:

Third parties may be selling class notes from this class without my authorization. Please be aware that such class materials may contain errors, which could affect your performance or grade. Use these materials at your own risk.

In-Class Recording Policy

Outside of the notetaking and recording services offered by Student Accessibility Services, the creation of an audio or video recording of all or part of a class for personal use is allowed only with the advance and explicit written consent of the instructor. Such recordings are only acceptable in the context of personal, private studying and notetaking and are not authorized to be shared with anyone without the separate written approval of the instructor.

Course Accessibility Statement

The University of Central Florida is committed to providing access and inclusion for all persons with disabilities. This syllabus is available in alternate formats upon request. Students with disabilities who need specific access in this course, such as accommodations, should contact the professor as soon as possible to discuss various access options. Students should also connect with Student Accessibility Services (Ferrell Commons, 7F, Room 185, sas@ucf.edu, phone (407) 823-2371). Through Student Accessibility Services, a Course Accessibility Letter may be created and sent to professors, which informs faculty of potential access and accommodations that might be reasonable.

Campus Safety Statement

Emergencies on campus are rare, but if one should arise in our class, we will all need to work together. Everyone should be aware of the surroundings and familiar with some basic safety and security concepts.

- In case of an emergency, dial 911 for assistance.
- Every UCF classroom contains an emergency procedure guide posted on a wall near the door. Please make a note of the guide’s physical location and consider reviewing the online version at http://emergency.ucf.edu/emergency_guide.html.
- Familiarize yourself with evacuation routes from each of your classrooms and have a plan for finding safety in case of an emergency. (Insert class-specific details if appropriate)
- If there is a medical emergency during class, we may need to access a first aid kit or AED (Automated External Defibrillator). To learn where those items are located in this building, see http://www.ehs.ucf.edu/AEDlocations-UCF (click on link from menu on left). (Insert class specific information if appropriate)
- To stay informed about emergency situations, sign up to receive UCF text alerts by going to my.ucf.edu and logging in. Click on “Student Self Service” located on the left side of the screen in the tool bar, scroll down to the blue “Personal Information” heading on your Student Center screen, click on “UCF Alert”, fill out the information, including your e-mail address, cell phone number, and cell phone provider, click “Apply” to save the changes, and then click “OK.”
- If you have a special need related to emergency situations, please speak with me during office hours.
- Consider viewing this video (https://youtu.be/NIKYajEx4pk) about how to manage an active shooter situation on campus or elsewhere.

Make-Up Assignments for Authorized University Events or Co-curricular Activities

Students who represent the university in an authorized event or activity (for example, student-athletes) and who are unable to meet a course deadline due to a conflict with that event must provide the instructor with documentation in advance to arrange a make-up. No penalty will be applied. For more information, see the UCF policy at <http://policies.ucf.edu/documents/4-401.1MakeupAssignmentsForAuthorizedUniversityEventsOrCocurricularActivities.pdf>

Religious Observances

Students must notify their instructor in advance if they intend to miss class for a religious observance. For more information, see the UCF policy at <http://regulations.ucf.edu/chapter5/documents/5.020ReligiousObservancesFINALOct17.pdf>.
Deployed Active Duty Military Students
If you are a deployed active duty military student and feel that you may need a special accommodation due to that unique status, please contact your instructor to discuss your circumstances.