

DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

Modeling and Control of Manufacturing Processes

MAE 6592/SYS 6581/MAE 4501

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| Course Title: | Modeling and Control of Manufacturing Processes, Fall 2020 (3 credits) |
| Prerequisites: | Basic probability and statistics (random process, etc.) |
| Lecture/Lab: | Tue, Thur 9:30 – 10:45AM, MAE 305 |
| Instructor: | Dr. Qing (Cindy) Chang email: qc9nq@virginia.edu |
| Office: | Mechanical Engr Bldg 310 |
| Office Hours: | Tue, Thur: 11:00 – 12:30pm & other time by appointment |
| Course Objective: | Introduction to manufacturing processes/system modeling and analysis. Fundamental principles of production systems. Analytical and simulation approach to production system performance analysis, continuous improvement, and design. Topics include mathematical modeling of production systems, Cyber physical manufacturing systems, improvement analysis, and dynamic characteristics. Includes both the relevant fundamental concepts and extensive practical knowledge base on which manufacturing research, development, and design depend. The students are expected to complete a term project, in which they will interpret real-life manufacturing plant operation or service operations in the light of course principles and suggest improvement solutions. A Python project will also be assigned to analyze system real-time performance. |
| Textbook: | Class Hands out and J. Li and S.M. Meerkov, <i>Production Systems Engineering</i> , Springer, 2009 |
| Optional software | 1. PSE tool box 2. Simul8 Software can be downloaded from course website |
| Examinations: | - 1 Midterm (take home, 1 ½ hours) - 1 Quiz (take home, 1 hours) • NO make-up exams unless arranged prior to the exams or documented emergency - In class presentation After Chapter 2, we will assign a 2-student group to review/preview the relevant chapters/sections, and give a 20 minutes presentation/discussion with the whole class |
| Projects and Homework: | 1 term project (team – 2 students) • Data collection, performance evaluation, model validation, improvement/bottleneck, etc. • Final report • Final presentation 1 Python Project (single person) |

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| | <ul style="list-style-type: none"> • Using Python to build a small production line model • Due 3 weeks after the assignment <p>Homework (single person)</p> <ul style="list-style-type: none"> • Practically every week, and due next week • Late submissions is not accepted except documented emergency | | | | | | | | | | | | |
| Grading: | <p>Semester letter grade is based upon your performance in the following categories:</p> <table> <tr> <td>Midterm exams</td> <td>15%</td> <td>Homework</td> <td>10%</td> </tr> <tr> <td>Quiz</td> <td>10%</td> <td>Term project</td> <td>40%</td> </tr> <tr> <td>In Class Presentation</td> <td>10%</td> <td>Python Project</td> <td>15%</td> </tr> </table> <p>A: 90 – 100; A-: 87 – 89; B: 86 – 78; C: 77 – 60; D: 50 – 59</p> | Midterm exams | 15% | Homework | 10% | Quiz | 10% | Term project | 40% | In Class Presentation | 10% | Python Project | 15% |
| Midterm exams | 15% | Homework | 10% | | | | | | | | | | |
| Quiz | 10% | Term project | 40% | | | | | | | | | | |
| In Class Presentation | 10% | Python Project | 15% | | | | | | | | | | |

Students with disabilities or learning needs

It is my goal to create a learning experience that is as accessible as possible. If you anticipate any issues related to the format, materials, or requirements of this course, please meet with me outside of class so we can explore potential options. Students with disabilities may also wish to work with the Student Disability Access Center to discuss a range of options to removing barriers in this course, including official accommodations. Please visit their website for information on this process and to apply for services online: sdac.studenthealth.virginia.edu. If you have already been approved for accommodations through SDAC, please send me your accommodation letter and meet with me so we can develop an implementation plan together.

Discrimination and power-based violence

The University of Virginia is dedicated to providing a safe and equitable learning environment for all students. To that end, it is vital that you know two values that I and the University hold as critically important:

1. Power-based personal violence will not be tolerated.
2. Everyone has a responsibility to do their part to maintain a safe community on Grounds.

If you or someone you know has been affected by power-based personal violence, more information can be found on the UVA Sexual Violence website that describes reporting options and resources available - www.virginia.edu/sexualviolence.

As your professor and as a person, know that I care about you and your well-being and stand ready to provide support and resources as I can. As a faculty member, I am a responsible employee, which means that I am required by University policy and federal law to report what you tell me to the University's Title IX Coordinator. The Title IX Coordinator's job is to ensure that the reporting student receives the resources and support that they need, while also reviewing the information presented to determine whether further action is necessary to ensure survivor safety and the safety of the University community. If you wish to report something that you have seen, you can do so at the **Just Report It** portal (<http://justreportit.virginia.edu/>). **The worst possible situation would be for you or your friend to remain silent when there are so many here willing and able to help.**

Religious accommodations

It is the University's long-standing policy and practice to reasonably accommodate students so that they do not experience an adverse academic consequence when sincerely held religious beliefs or observances conflict with academic requirements.

Students who wish to request academic accommodation for a religious observance should submit their request in writing directly to me as far in advance as possible. Students who have questions or concerns about academic accommodations for religious observance or religious beliefs may contact the University's Office for Equal Opportunity and Civil Rights (EOCR) at UVAEOCR@virginia.edu or 434-924-3200.

Honor

I trust every student in this course to fully comply with all of the provisions of the University's Honor Code. By enrolling in this course, you have agreed to abide by and uphold the Honor System of the University of Virginia, as well as the following policies specific to this course.

- All graded assignments must be pledged.
- All suspected violations will be forwarded to the Honor Committee, and you may, at my discretion, receive an immediate zero on that assignment regardless of any action taken by the Honor Committee.

Please let me know if you have any questions regarding the course Honor policy. If you believe you may have committed an Honor Offense, you may wish to file a Conscientious Retraction by calling the Honor Offices at (434) 924-7602. For your retraction to be considered valid, it must, among other things, be filed with the Honor Committee before you are aware that the act in question has come under suspicion by anyone. More information can be found at <http://honor.virginia.edu>. Your Honor representatives can be found at: <http://honor.virginia.edu/representatives>. Additionally, [Support Officer, if any enrolled], an Honor support officer enrolled in this class, is also available for questions.