CHE 365-101, FALL 2023, SYLLABUS

OTTO H YORK DEPARTMENT OF CHEMICAL AND MATERIALS ENGINEERING @ NJIT

REES B. RANKIN

INTRODUCTION

CATALOGUE DESCRIPTION

"Prerequisites: CHE 370, CS 115 co-requisite: CHE 360. Introduction to basic concepts of computational methods for solving chemical engineering problems and performing process simulations. Topics include common numerical techniques encountered in chemical engineering, for the solution of linear and nonlinear algebraic equations and ordinary differential equations, differentiation/integration, optimization and interpolation/regression of data. Students will be exposed to modern computational software and commercial chemical processes simulators."

INSTRUCTOR GOALS

Through successful completion of this course, students will get the opportunity to expand their knowledge, experience, and skills in use of the MATLAB computational modeling platform to solve challenging numerical problems related to Chemical Engineering Unit Operation processes. Other "non-ChemE" analogous problems will be shown to further generalize the applicability of the methods to general problem solving skills. Specific example problems will be used to coincide with and increase student competencies in solving problems and plotting data similar to the experiences they will have in CHE495 and CHE496 lab courses.

PREREQUISITES AND/OR COREQUISITES

PREREQUISITES

CHE 370 (Heat & Mass Transfer),
CS115

COREQUISITES

CHE360 (Separation Processes)

CLASS MEETING TIMES AND LOCATIONS

WEDNESDAYS 18:00 TO 22:00

Tiernan Hall, 411 (4th Floor Computer Lab)

LEAD INSTRUCTOR

Rees Rankin, Ph.D.   rees.b.rankin@njit.edu   https://njit.webex.com/meet/rbr4

Office Hours (IN PERSON)

Monday   12:30 TO 14:30

Tuesday: 12:00 TO 15:00

Friday: By request when possible

You can also book specific request times through my Doodle page. I will make some other time slots each week; they will not be constant. They will be based around other meetings and non-class duties I have. So for example, one week it might mean all of Monday is free. Another week it might mean Friday afternoon is free. You'll need to check regularly, but I will make as much time available as possible.

LINK TBD / WILL BE POSTED ON CANVAS ANNOUNCMENTS

STUDENT TA'S

TBD #1   email TBD

*Note : The TA is responsible for grading student work based on rubrics and guidelines supplied by the instructor. The Instructor is solely responsible for grading exams or final projects. If you have a question on graded work by the TA, document the concerns via email to both the TA and the instructor. If appropriate and necessary, the instructor will override incorrect grades.

ALTERNATE TA

Shawn Yetman   shawn.yetman@njit.edu

ATTENDENCE

POLICY

Attendance for **ALL** scheduled class sessions is **Mandatory**! If you need to miss class for an approved reason, let me know in advance if you can. If you are working on a team/group based project, make sure your group knows in advance of your absence, if you can, and document all members' approval. Professional behavior is expected! Students who do not attend lab sessions will be removed from their teams/groups if such are in place and required to conduct work independently.

F2F MODE STATEMENT(S)

GENERAL

Our course for Fall 2023 is listed as a Face to Face (F2F) class and will be run as such unless there is a change in university policy or a government mandate requiring a change. If the Department, University, or other operating government agency above the Instructor's "paygrade" dictate we must change operation due to worsening COVID, then we can and must follow these requirements. In such an event, supplemental information to this document will be provided as needed to adapt operation of the course accordingly.

In such an event of policy change, You will be required to follow all COVID safety requirements and policies in place for this course, at all times. Failure to do so may result in removal from the course.

COURSE ASSIGNMENT AND GRADE STRUCTURE (CONVERGED MODE)

ASSIGNMENT GRADE WEIGHTINGS

All assignments are to be done digitally and submitted through Canvas and/or related online platforms (such as Matlab Grader, Slido, etc). File formats, specification, and requirements will be provided as needed.

- Intro Day Assignments   3%
- In Class Quizzes   5%
- In Class Survey(s) (Participation)   2%
- Post-Class Lab Homeworks (best 10)   30%
- In Class Lab Exercises (best 10)   20%
- MidTerm Exam(s)   25%
- Final Project Report & Presentation (peers)   15%   DATE TBD

*NOTE CHECK CANVAS LMS "TO DO LIST" and Assignment Details for due dates, grading rubrics, and all other relevant instructions. Differing assignments may differ in some ways from each other. Check regularly and frequently.

** Exam will be open book/notes/etc. It will *NOT* be open neighbor, open google, open CHATGPT/etc.   It is a test of your understanding and mastery of the material in the course to date based on your own work(s) and effort(s).

GRADES (LETTER SCALE)

90 to 100 : A	75 to <80 : C+	60 to <65 : D
85 to <90 : B+	70 to <75 : C	<60 : F
80 to <85 : B	65 to 70: D+	

Note: there is no further rounding or curving of Grades for this course. If your final average is an 89.9913, that is an A-, not an A.

ASSIGNMENT RUBRICS

Each assignment in the course (LAB exercise, Homework, and Final Project) will have its own rubric, point breakdown, and category descriptions posted with them.

Read the rubric(s) carefully ; **good grades** are <u>**rather easily achieved**</u> in this course by:

1. Completing all work on time as requested with clearly documented effort
2. Analyzing the results correctly and with thorough thought when asked to do so
3. Translating your knowledge from scaffolded sequential assignments into the Midterm Exam and Final Project. These will not require you to go do something completely brand new that we have not covered in the course to date; however they will require you to synthesize ideas together to solve problem(s) that may be more complex than we have yet covered in the course.

Week(s)

1. 9/6/2023-   Intro Day, Intro/Basics of Matlab and Coding
2. 9/13/2023-   Numerical Methods
3. 9/20/2023-   Physical Properties
4. 9/27/2023-   Thermodynamics
5. 10/4/2023-   **MidTerm Exam #1**
6. 10/11/2023-   Fluid Dynamics
7. 10/18/2023-   Chemical Reaction Engineering 1
8. 10/25/2023-   Chemical Reaction Engineering 2
9. 11/1/2023-   Mass Transfer
10. 11/8/2023-   **MidTerm Exam #2**-   <mark>11/13 is last day to Withdraw</mark>
11. 11/15/2023-   Heat Transfer 1
12. 11/22/2023-   Heat Transfer 2
13. 11/29/2023-   Optimization 1
14. 12/6/2023-   Optimization 2
15. 12/13/2023-   Help/Review Session
16. 12/??/2023-   **Final Project Report & Presentation(s)** date TBD to be set by registrar

*note this is tentative and may be modified subject to instructor discretion , governing agency mandate, or other reasons that require significant change to operational scope. However, if "nothing goes wrong", this is what we will adhere to.

** note that the Final Project Presentation Day/Time is not yet scheduled, it will be in place of a normal Final Exam. The date/time will be provided to you at the earliest convenience when it is available to the Instructor.

GROUPS (IF APPLICABLE TO THIS COURSE)

ASSIGNMENT OF MEMBERS

If there are any team/group assignments or projects in the course, the instructor will make groups using the CATME team builder tool. The groups will be posted to email/Canvas that evening. Group members will not be changed unless significant issues arise (such as unsanctioned behavior, etc) .

PEER-ASSESSMENT OF MEMBER CONTRIBUTIONS

If there are any team/group assignments or projects in the course the instructor will create and provide anonymous online peer-assessment tool(s) such as CATME for group members to disclose and validate the equality of contribution of all team members. *The results of this feedback may be used at the instructor's discretion to adjust grades.* **COMPLETION OF ALL CATME SURVEYS IS MANDATORY AND FAILURE TO DO SO WILL RESULT IN A DEDUCTION OF A LETTER GRADE FROM THE STUDENT'S FINAL COURSE AVERAGE.**

CATME FACTORS *WILL BE USED* TO ADJUST INDIVIDUAL SCORES FROM THE TEAM SCORE FOR AN ASSIGNMENT. TAKE YOUR TEAMWORK RESPONSIBILITIES SERIOUSLY.

LMS

Canvas Site: http://canvas.njit.edu --- Please check this site and your email often (**at least once a day**). Project details, in-class work, assignments, announcements, and useful memos will be posted here. Basically, every document for the course will be provided and maintained here.

WEBEX

IF* the course changes modality from F2F to remote learning due to COVID or other policy requirements, course lectures/labs will be conducted via WEBEX. LINKS would be provided accordingly if necessary.

EMAIL

Instructor and TA emails provided above. Email is a documented and maintained communications tool where permanent records of correspondence can be kept. If you, for example, have an issue logging in to Canvas, you can email me the time, a screenshot, and a copy of your assignment; while I will still ask you to upload the work to Canvas eventually, this will serve as proof that you were not late in your assignment due to your own faults. Instructor and TA will send any announcements to the course through Canvas announcement and bulk class email list.

TEXTBOOK

The course is centered around providing instruction that complements the following textbook.
IT IS REQUIRED FOR THE COURSE.
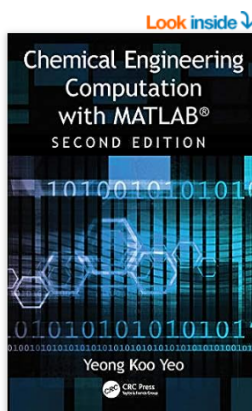
Chemical Engineering Computation with MATLAB®
⬆

2nd Edition

by Yeong Koo Yeo (Author)

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From $28.33/mo (6 mo) with 0% APR

Chemical Engineering Computation with MATLAB® 2nd Edition
by Yeong Koo Yeo (Author)

MATH SOFTWARE

Math Solver: This is a course focused on using MATLAB. Class will be conducted in Tiernan Hall 411 which has computers with Matlab, but not enough for everyone. You are expected to have MATLAB installed on your own laptop device you bring to class each session.

LEARNING OUTCOMES & ABET RELATED

GOALS

Among other things learned during the semester, upon successful completion of this course with a passing level of mastery, students will be able to:

1. Master basic programming proficiency

2. Describe and interpret error and convergence

3. Solve Root searching problems using various methods while assessing the

trade-offs between them

4. Apply Optimization methods in order to search for maxima or minima of a function.

5. Represent and solve a system of linear equations in matrix form

6. Fit data using Linear Regression

7. Integrate functions Numerically

8. Differentiate functions Numerically

9. Solve Ordinary Differential Equations Numerically

10. Utilize advanced engineering software packages

11. Work on group exercises and apply a range of numerical methods to evaluate solutions to

chemical engineering problems

12. Self-acquire Advanced Engineering Software Skills

13. Communicate Project Results in a Technical Writing Report FormatOUTCOMES

This course explicitly addresses the following ABET student outcomes: 1, 3, 5, 7 and their sub-component outcomes

NJIT POLICIES

ACADEMIC INTEGRITY

"Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university**. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu"

DISABILITY/ACCOMMODATION

"NJIT is committed to providing students with documented disabilities equal access to programs and activities. If you have, or believe that you may have, a physical, medical, psychological, or learning disability that may require accommodations, please contact Student Disability Services. Information on the self-identification, documentation and accommodation process can be found on the webpage at: http://www.njit.edu/counseling/services/disabilities.php."

COVID specific: if you have a legitimate request for accommodation to not attend a scheduled meeting of the course physically in person due to COVID, the request must go through the Dean of Students office (DoS).

DIVERSITY AND INCLUSION

NJIT promotes an active , respectful culture and environment for learning and work that involves welcoming all peoples , affording them equal opportunities, and including them and valuing their contributions, skills, and abilities equally, as can be read here:

"The mission of Diversity and Inclusion is to initiate and support activities that promote cultural competency among students of the NJIT Community. We are committed to raising self-awareness, mutual understanding, knowledge, and respect for others. Our approach is relational in that we believe in growth-fostering relationships, therefore we commit to providing a welcoming place for all. We pledge to offer a safe space and outlet for dialogue; we commit to provide mentorship and support; as well as engage students to become advocates for issues of injustice in our multicultural world."
https://www.njit.edu/diversityprograms/about-diversity-and-inclusion

Beyond this general philosophy, the university has the following policy against discrimination :

"New Jersey Institute of Technology reaffirms its commitment to a policy of non-discrimination on the basis of race, sex, sexual orientation, age, religion, ethnic origin, handicap or veterans' status in its employment policies, educational programs and activities under university control.
Assuring a climate of equal opportunity is the direct responsibility of all levels of management. Administrative and supervisory personnel are required to comply with applicable government regulations and the affirmative action goals of the university.

Among these are Executive Orders 11246 and 11375 (Affirmative action); the Civil Rights Act of 1964, as amended; Title IX of the Education Amendments of 1972 (Sex Discrimination); Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act (Non-discrimination on the Basis of Handicap); The New Jersey Law Against Discrimination, Title 10, Chapter 5, 10:5-1 to 10:5-28, NJ Revised Statutes, as amended; and the New Jersey Governor's Code of Fair Practices, Executive Order No. 21 (1965), as amended and Executive Order No. 39 (1991), "Prohibition in State Government of Discrimination Based on Sexual Orientation."

Any reported act of discriminatory behavior will be investigated through the Office of the Dean of Student Services, the Office of Compliance and Community Relations, or Office of General Counsel and Employment Policy Relations."

https://www.njit.edu/diversityprograms/university-non-discrimination-policy

Students in this course engaged in discriminatory behaviors towards their peers, TA(s), other students, other employees, or the Instructor will be sanctioned per university policy(ies).

COMPUTER LABORATORY SAFETY

Students will use the Computational Laboratory space per all signage and regulations posted on doors, boards, or other spaces in the room. Failure to adhere to these policies may result in disciplinary action including removal from the space.