

Fall 2019

CHE 240-001: Chemical Process Calculation II

Boris Khusid

Follow this and additional works at: <https://digitalcommons.njit.edu/cme-syllabi>

Recommended Citation

Khusid, Boris, "CHE 240-001: Chemical Process Calculation II" (2019). *Chemical and Materials Engineering Syllabi*. 64.
<https://digitalcommons.njit.edu/cme-syllabi/64>

This Syllabus is brought to you for free and open access by the NJIT Syllabi at Digital Commons @ NJIT. It has been accepted for inclusion in Chemical and Materials Engineering Syllabi by an authorized administrator of Digital Commons @ NJIT. For more information, please contact digitalcommons@njit.edu.

Syllabus
ChE 240 Chemical Process Calculation II
Fall 2019

Otto H. York Department of Chemical & Materials Engineering
New Jersey Institute of Technology

Fall 2019 Academic Calendar

September	3	Tuesday	First Day of Classes
September	7	Saturday	Saturday Classes Begin
September	9	Monday	Monday Classes Meet
September	13	Friday	Last Day to Add/Drop a Class
September	13	Friday	Last Day for 100% Refund, Full or Partial Withdrawal
September	14	Saturday	W Grades Posted for Course Withdrawals
September	16	Monday	Last Day for 90% Refund, Full or Partial Withdrawal - No Refund for Partial Withdrawal after this date
September	30	Monday	Last Day for 50% Refund, Full Withdrawal
October	21	Monday	Last Day for 25% Refund, Full Withdrawal
November	11	Monday	Last Day to Withdraw
November	26	Tuesday	Thursday Classes Meet
November	27	Wednesday	Friday Classes Meet
November	28	Thursday	Thanksgiving Recess Begins
December	1	Sunday	Thanksgiving Recess Ends
December	11	Wednesday	Last Day of Classes
December	12	Thursday	Reading Day 1
December	13	Friday	Reading Day 2
December	14	Saturday	Final Exams Begin
December	20	Friday	Final Exams End
December	22	Sunday	Final Grades Due

General course information

CHE 240 - Chemical Process Calculation II. This course covers the basic principles of energy balances for a variety of engineering systems. Combined with material from other sophomore courses, simple designs of chemical processes are considered. The course uses primarily chemistry and algebra to assess operating performance of a wide variety of chemical processes and equipment.

Days/ Times:

Tuesday, 01:00 PM - 02:20 PM, KUPF 209; Thursday, 02:30 PM - 03:50 PM, KUPF 209

Pre-requisites: Chemical Process Calculations I (ChE 210), Chemical Engineering Thermodynamics I (ChE 230),

Credits and contact hours

2 credits, 3 contact hours

Course coordinator/instructor

Dr. Boris Khusid

Faculty Memorial Hall 215 (office); 973-596-5707 (phone); khusid@njit.edu (e-mail)

<http://chemicaleng.njit.edu/people/khusid.php> (website)

Office Hours Faculty Memorial Hall R215, Tuesday, 9 am-12:20 pm

Note: you can always schedule an appointment by email if the office hour time conflicts with your classes

Specific course information

Textbooks: Required - Felder, R. M., Rousseau, R. W., Bullard, L. G., “Elementary Principles of Chemical Processes”, 4th Edition, John Wiley & Sons, New York, New York, 2016
<https://www.wiley.com/en-us/Elementary+Principles+of+Chemical+Processes%2C+4th+Edition-p-ES81118431221>

Recommended –1) Poling B.E., Prausnitz J.M., O’Connell J.P., “The Properties of Gases and Liquids” 5th Edition, McGraw-Hill, 2004

<https://www.accessengineeringlibrary.com/content/book/9780070116825>

2) Green D.W., Southard M.Z., “Perry's Chemical Engineers' Handbook” - 9th Edition, McGraw-Hill, 2019 or earlier editions

<https://www.accessengineeringlibrary.com/content/book/9780071834087>

Other learning material: The lecture notes to be posted on the class website give a summary of the course material. Please print and bring them along with your textbook and calculator to the class. You will make additional notes during the lectures.

Required software: Latest versions of MS Office, Adobe Reader (all can be downloaded from NJIT IST webpage). Student Mall labs and ChE department PC lab have most of the software.

Course objectives

- 1: Provide students with knowledge of fundamental concepts of chemical engineering calculations and skills for design of chemical processes and equipment
- 2: Enable students to estimate physical properties of substances, predict phase and reaction equilibrium in multi-component systems and use this knowledge to analyze practical applications
- 3: Enable students to use basics of applied chemistry/ thermodynamics and unit conversion in material and energy balance calculations
- 4: Develop skills to work in problem-solving teams to acquire new knowledge on specific chemical engineering applications and communicate it in written & verbal form

Grading

Your performance will be graded on an absolute scale, so your grade is not affected by how others do. Final letter grades will be awarded based on your weighted average score as follows:

Homework (individual)	10%
Quizzes (individual)	15%
In-class group activities	10%
Midterm exam 1 (individual)	15%
Midterm exam 2 (individual)	15%
Final exam (individual)	35%

Letter grades will be assigned automatically by an Excel code based on the following totals:

A (Superior)	85% and above
B+ (Excellent)	80%-84.9%
B (Very Good)	75%-79.9%
C+ (Good)	70%-74.9%
C (Acceptable)	65%-69.9%
D (Minimum)	55%-64.9%
F (Inadequate)	Less than 55%

For success, you are strongly advised to

Review/work on the material of the previous lecture before the next class.

Read the lecture notes and covered sections of the required textbook.

Bring the printed lecture notes to class along with the computer and calculator.

Take additional notes during the lectures.

Work out all derivations and examples in the lecture notes and in-class examples on your own after each lecture.

In case of questions, please see the instructor during Office Hours or raise questions in the class. Do not delay it to the exam week.

Policies on assignments/exams and classroom policy

Homework is an integral part of the course:

- Homework is collected at the beginning of the class.
- Late homework will not be accepted for grading; if you cannot attend the class you have send the solution to the instructor before the class in **.doc or .pdf formats**.

Do not send images taking with cell phone!

- Feedback on the homework will be provided during lectures, solutions will be discussed and posted on the class website; graded homework will be returned
- Each problem will be graded individually

You are allowed to discuss HW problems with peer students, but cannot copy the solution.

CME Department policy on electronic devices:

- Electronic devices (i.e., cell phones, tablets, and laptops) are allowed for using in class only when the work specifically assigned requires live external connection for data, or during in-class presentations.
- The use of electronic devices (i.e., cell phones, tablets, and laptops) that can communicate externally is not allowed during quizzes and exams.

Classroom policies:

- Attendance is important. There is a high correlation between failure and poor class attendance
- Eating and drinking are not allowed during class
- Behave professionally and show respect to fellow students and the instructor

Quizzes:

There will be quizzes occasionally in the class. If you miss the class, you will miss the quiz that day. There will be no makeup quiz.

Exam policy:

There will be two midterm and one final exams; they are open book & lecture notes, calculators can be used. Exact date of a midterm exam will be announced a week before.

- The comprehensive final exam during Finals' week will cover the course materials.
- The midterm and final exams must be completed individually, in accordance with the NJIT Honor Code.
- Each exam problem will be graded independently.
- A missed midterm exam will be averaged into the final grade as zero, unless an excuse is obtained. Excuses are granted only for very serious circumstances attested to by the NJIT Dean of Student Office. A student who has been excused will be required to take a makeup exam.
- A students missing the final exam without a documented reason will get an Incomplete.

Disputing a grade on tests/assignments:

If a student has questions about the grade received for an exam, homework, or classwork he/she must talk to the instructor (or the teaching assistant where appropriate) **no later than a week** after the graded activity has been returned to students.

Accommodations due to disability: If you need accommodations due to a disability please contact Center for Student Success Disability Support Services, Fenster Hall Room 260 to discuss your specific needs. A Letter of Accommodation Eligibility from the Disability Support Services office authorizing your accommodations will be required.

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

Specific goals for the course

- a. The student will be able to
 1. define concepts of materials & energy balances and bring examples of them
 2. work with key chemical process variables and convert units between different unit systems
 3. formulate materials & energy balances for processes in closed systems
 4. formulate materials & energy balances for processes in open systems
 5. evaluate physical properties of nonreactive single phase and multiple phase systems
 7. formulate materials and energy balances for reactive processes
 8. evaluate physical properties of reactive systems
 9. perform mass & energy balance calculations for processes involving single and multiple units
 10. perform mass & energy balance calculations for processes in reactive systems

- 11. quantify performance of chemical processes using concepts learned in the class
- 11. access operating performance of chemical processes using materials & energy balances
- 11. work in a problem-solving team to acquire new knowledge on specific chemical engineering applications and communicate it in written & verbal form

b. This course explicitly addresses the following student outcomes: a, d, e, g, i, k; 1, 3, 5, 7

Tentative weekly listing of topics (15-week schedule)

Week	Book Chapters
1	Review of Chapters 1-4
2	Chapter 5/6
3	Chapter 6
4	Chapter 6
5	Chapter 6/7
6	Chapter 7
7	Chapter 7 Midterm exam 1
8	Chapter 7/8
9	Chapter 8
10	Chapter 8
11	Chapter 8
12	Chapter 8/9 Midterm exam 2
13	Chapter 9
14	Chapter 9
15	Chapter 9