# Syllabus

**ChE 240 Chemical Process Calculation II**  
*Fall 2020*

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

## Fall 2020 Academic Calendar

<table>
<thead>
<tr>
<th>Month</th>
<th>Day</th>
<th>Event details</th>
</tr>
</thead>
<tbody>
<tr>
<td>September</td>
<td>1 Tuesday</td>
<td>First Day of Classes</td>
</tr>
<tr>
<td>September</td>
<td>5 Saturday</td>
<td>Saturday Classes Begin</td>
</tr>
<tr>
<td>September</td>
<td>7 Monday</td>
<td>Labor Day</td>
</tr>
<tr>
<td>September</td>
<td>8 Tuesday</td>
<td>Monday Classes Meet</td>
</tr>
<tr>
<td>September</td>
<td>8 Tuesday</td>
<td>Last Day to Add/Drop a Class</td>
</tr>
<tr>
<td>September</td>
<td>8 Tuesday</td>
<td>Last Day for 100% Refund, Full or Partial Withdrawal</td>
</tr>
<tr>
<td>September</td>
<td>9 Wednesday</td>
<td>W Grades Posted for Course Withdrawals</td>
</tr>
<tr>
<td>September</td>
<td>14 Monday</td>
<td>Last Day for 90% Refund, Full or Partial Withdrawal - No Refund for Partial Withdrawal after this date</td>
</tr>
<tr>
<td>September</td>
<td>28 Monday</td>
<td>Last Day for 50% Refund, Full Withdrawal</td>
</tr>
<tr>
<td>October</td>
<td>19 Monday</td>
<td>Last Day for 25% Refund, Full Withdrawal</td>
</tr>
<tr>
<td>November</td>
<td>9 Monday</td>
<td>Last Day to Withdraw</td>
</tr>
<tr>
<td>November</td>
<td>25 Wednesday</td>
<td>Friday Classes Meet</td>
</tr>
<tr>
<td>November</td>
<td>26 Thursday</td>
<td>Thanksgiving Recess Begins</td>
</tr>
<tr>
<td>November</td>
<td>29 Sunday</td>
<td>Thanksgiving Recess Ends</td>
</tr>
<tr>
<td>December</td>
<td>10 Thursday</td>
<td>Last Day of Classes</td>
</tr>
<tr>
<td>December</td>
<td>11 Friday</td>
<td>Reading Day 1</td>
</tr>
<tr>
<td>December</td>
<td>14 Monday</td>
<td>Reading Day 2</td>
</tr>
<tr>
<td>December</td>
<td>15 Tuesday</td>
<td>Final Exams Begin</td>
</tr>
<tr>
<td>December</td>
<td>21 Monday</td>
<td>Final Exams End</td>
</tr>
<tr>
<td>December</td>
<td>23 Wednesday</td>
<td>Final Grades Due</td>
</tr>
</tbody>
</table>
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 access operating performance of a wide variety of chemical processes and equipment.

Days/ Times/Location:
Tuesday, 02:30 PM - 03:50 PM; Thursday, 02:30 PM - 03:50 PM; CTR ATRIUM

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); 973-596-3316 (phone); khusid@njit.edu (e-mail)
http://chemicaleng.njit.edu/people/khusid.php (website)

Office Hours Faculty Memorial Hall R215, Tuesday, 9 am-1 pm by arrangement to ensure proper social distancing.
Note: you can always schedule an appointment by email if the office hour time conflicts with your classes.

Specific course information

https://www.accessengineeringlibrary.com/content/book/9780070116825
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 have them along with your textbook and calculator in the class. You will make additional notes during the lectures.

Course delivery: Converged mode: Students have the option to attend remotely even when it is their turn to be in the classroom. This does not require any special permission to the student or notification of the instructor.

Specific goals for the course:
a. A student should be able to:
1. Use fundamental concepts of chemical engineering to perform calculations for design of chemical processes and equipment
2. Use basics of applied chemistry/ thermodynamics and unit conversion in material and energy balance calculations
3. Estimate physical properties of substances, predict phase and reaction equilibrium in single and multi-component systems in practical applications
4. Use basic computational tools for calculations of material and energy balances in chemical processes and equipment
5. Begin to understand the importance of safety issues and start evaluating potential safety hazards in chemical processes
6. Work in problem-solving teams to acquire new knowledge on specific chemical engineering applications and communicate it in written & verbal form

b. This course explicitly addresses the following ABET student outcomes:
   1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

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:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weightage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework (individual)</td>
<td>10%</td>
</tr>
<tr>
<td>Quizzes (individual)</td>
<td>10%</td>
</tr>
<tr>
<td>Project/group activities</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm exam 1 (individual)</td>
<td>15%</td>
</tr>
<tr>
<td>Midterm exam 2 (individual)</td>
<td>15%</td>
</tr>
<tr>
<td>Final exam (individual)</td>
<td>30%</td>
</tr>
</tbody>
</table>

Letter grades will be assigned automatically by an Excel code based on the following totals:
- A (Superior) 90% and above
- B+ (Excellent) 85%-89.9%
- B (Very Good) 80%-84.9%
- C+ (Good) 75%-79.9%
- C (Acceptable) 70%-74.9%
- D (Minimum) 60%-69.9%
- F (Inadequate) Less than 60%

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.
- **Use** the printed lecture notes in 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 (HW) assignments will be posted on Canvas and must be uploaded into Canvas in DOC or PDF format by the due date. **Do not send images taking with cell phone!** No late HW will be accepted for grading without a documented University authorized absence. All HW assignments will be individual.
  - **Homework format:** Failure to observe the following HW conventions will result in a downgrade of the HW score.
  - **File name** should include student’s first and last names, HW assignment No.
  - **Header:** The top of each sheet of a HW assignment must contain the following information from left to right:
• **Writing**: Homework should be printed carefully and legibly. If it can’t be read, it can’t be graded!
• **Problem-solution format**: Problems should be clearly labeled and include the HW problem number, brief problem statement and often diagram to illustrate the process, and present basic steps and calculations.
• **Calculations** - Homework should include complete calculations for every calculation presented to demonstrate how results were obtained.
  - Include all units for each term in each equation.
  - Indicate the final solution by boxing it in with a rectangular.
 ➢ Feedback on the homework will be provided during lectures, solutions will be discussed and posted on the class website.
 ➢ Each problem will be graded individually (up to 5 points). You are allowed to discuss HW problems with peer students, but cannot copy the solution.

**Group Project Assignment**
Form a team (up to 3 students) to carry out a short review project on applications of the course topics to chemical processes & equipment, prepare and post the progress/final reports & slides on the **class website**, and give an **oral presentation** to the class.

**Guidelines** for preparing a project, topics & abstracts of previously presented projects and **detailed criteria** for grading the project report and oral presentation are posted on the class website. Posted titles & abstract of reports previously presented serve as examples, but cannot be copied!

**Evaluation of project/group activity**
Each student will be asked at the end of the semester to confidentially rate his/her performance/effort as well as that of all his/her group-members. The **evaluation form** posted on the **class website**. The completed evaluation form has to be submitted either as a hard copy in a sealed envelope or as a word-file attached to an e-mail to the instructor.
  • Evaluation forms are due on **Reading Day**.
  • Submission of the form after Reading Day and before the final exam will lead to a downgrade of the project score.
  • A student will not be allowed to take the final exam without prior submission of the self & peer evaluation form.

**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, WebEx online meetings or during in-class presentations.

**Classroom policies:**
• Attendance in the classroom or logged in to the WebEx online meeting is required. There is a high correlation between failure and poor class attendance.
• When you may attend in person, you are required to sit in a seat which matches your color code when you come to class and ensure proper social distancing. Detailed Covid-19 code of conduct rules and regulation requirements/guidelines are posted on the class website.
• Eating and drinking are not allowed during the class.
• Behave professionally and show respect to fellow students and the instructor.
• Cellphones should be turned off during the class.
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.

ALL EXAMS WILL BE CONDUCTED ON-LINE. DO NOT COME TO THE
CLASSROOM ON EXAM DAY!
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 couple of weeks 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.
- Use the HW format for presenting solutions of exam problems.
- Each exam problem will be graded independently (up to 5 points).
- 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 student 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. Exam scores can only be disputed during
the official Office Hours, not during class time or via email.

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: https://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 https://www.njit.edu/dos/
## Tentative weekly listing of topics (15-week schedule)

<table>
<thead>
<tr>
<th>Week</th>
<th>Book Chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Review of Chapters 1-4</td>
</tr>
<tr>
<td>2</td>
<td>Review of Chapters 1-4/ Chapter 5</td>
</tr>
<tr>
<td>3</td>
<td>Chapters 5/6</td>
</tr>
<tr>
<td>4</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>5</td>
<td>Chapter 6/7</td>
</tr>
<tr>
<td>6</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>7</td>
<td>Midterm exam 1</td>
</tr>
<tr>
<td>8</td>
<td>Chapter 7/8</td>
</tr>
<tr>
<td>9</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>10</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>11</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>12</td>
<td>Chapter 8/9 Midterm exam 2</td>
</tr>
<tr>
<td>13</td>
<td>Chapter 9</td>
</tr>
<tr>
<td>14</td>
<td>Chapter 10/Project presentations</td>
</tr>
<tr>
<td>15</td>
<td>Project presentations /Review</td>
</tr>
</tbody>
</table>