

EMA 4161C Physical Properties of Polymers

1. Catalog Description (including credit hours) – Molecular structure and the physical property relationships for polymers: viscoelastic behavior, the glass transition, thermomechanical and rheological properties, the crystalline and amorphous molecular solid state. Correlation of properties with design engineering of polymer applications. Laboratory section included. 4 credits.
2. Pre-requisites and Co-requisites – EMA 3066
3. Course Objectives
  - Develop an understanding of structure-property relationships in polymers.
  - Become able to conduct experiments to characterize the structure and properties of polymers.
  - Design an experiment to characterize a polymer system.
  - Develop communication skills.
  - Develop lifelong learning skills.

4. Contribution of course to meeting the professional component.

| Professional Component           | # of credits |
|----------------------------------|--------------|
| Math and science.                |              |
| Engineering.                     | 3            |
| General education.               |              |
| Other.                           |              |
| Does it contain design (Y or N)? | N            |

5. Relationship of course to program outcomes

| Outcome   | Assessed? | Assessment Method |
|---|-----------|-------------------|
| a: Apply knowledge of math, science, and engineering.   |           |                   |
| b1: Conduct experiments, analyze and interpret data.    | X         | Lab reports.      |
| b2: Conduct statistical analysis.                       |           |                   |
| c: Solve materials selection and design problems.       |           |                   |
| d: Function on teams.                                   |           |                   |
| e: Identify, formulate, and solve engineering problems. | X         | Lab reports.      |
| f: Understand professional and ethical responsibility.  |           |                   |
| g: Communicate effectively.                             | X         | Lab reports.      |
| h1: Understand economic impact.                         |           |                   |

|  |   |                        |
|--|---|------------------------|
| h2: Understand global, societal, and environmental impact. |   |                        |
| i: Engage in lifelong learning.                            | X | Exams and lab reports. |
| j: Knowledge of contemporary issues.                       |   |                        |
| k: Use techniques, skills, and tools of MSE.               |   |                        |

6. Instructor – Elliot P. Douglas
  - a. Office location: 156 Rhines Hall
  - b. Telephone: 352-846-2836 (office); 352-246-3505 (cell)
  - c. E-mail address: edoug@mse.ufl.edu
  - d. Class Web site: login to e-Learning at <https://lss.at.ufl.edu/>
  - e. Office hours:
  
7. Teaching Assistant –
  - a. Office location:
  - b. Telephone
  - c. E-mail address:
  - d. Office hours:
  
8. Meeting Times – Lecture: Tuesday period 4, Thursday period 4-5; Lab: Thursday period 9-11
  
9. Class/laboratory schedule – Three 50 minute lecture periods and one 3 hour lab session per week.
  
10. Meeting Location – 234 MAEB
  
11. Material and Supply Fees – None
  
12. Textbooks and Software Required
  - a. Introduction to Polymers
  - b. Young and Lavell
  - c. 2011, 3<sup>rd</sup> Edition
  - d. 978-0-8493-3929-5
  
13. Recommended Reading – None
  
14. Course Outline - General topics are polymer fundamentals and characterization, solution behavior, the amorphous state, the crystalline state, and polymer properties. A detailed reading list is provided on the course website.
  
15. Attendance and Expectations - Attendance in lecture is not part of the course grade; however, all students are expected to attend class. The class is taught in an interactive

lecture format, and includes discussion and practice problems. Cell phones should be turned off in class. Reading of newspapers, work on assignments for this or other classes, or other activities that are not part of the class are not allowed during class time. Attendance is lab is required. Missing one lab period without being excused will result in losing half of the lab points for the semester. Missing two lab periods without being excused will result in automatic failure of the course.

16. Grading – Daily homework 10%; Exams 15% each; Labs 30%.

Homework is due by the start of the class period each day. Homework assignments are posted on the website. All homework must be submitted as a PDF file through the website. It is your responsibility to ensure that you upload the file before it is due. It is highly recommended you upload it well ahead of the deadline in case there are any technical problems. No late homework will be accepted for any reason, including technical issues with the submission process.

There are four exams. The exams will be based on the objectives for each class period. Lack of attendance at any exam will result in automatic failure in the course. Exams will be held in class on September 5, September 26, October 31, and November 21. Half the points deducted on the exam may be gained back by returning the original exam, an explanation of the correct answer, and an explanation of what your error was on the exam and why you made that error. These explanations are due one week after the exam is returned.

Lab reports will be written individually. Your lab grade will be determined by how many lab reports you successfully complete. Labs will be reviewed by the instructor, comments made, and the lab returned for resubmission. This process will continue until the instructor indicates the lab report is acceptable. You may not turn in a lab report until the previous one has been accepted.

17. Grading Scale - The grading scale is indicated below. Grades are not curved.

|              |     |      |      |     |      |      |     |      |      |     |      |     |
|--------------|-----|------|------|-----|------|------|-----|------|------|-----|------|-----|
| Percentage   | ≥92 | ≥88  | ≥84  | ≥80 | ≥76  | ≥72  | ≥68 | ≥65  | ≥62  | ≥59 | ≥56  | <56 |
| Letter Grade | A   | A-   | B+   | B   | B-   | C+   | C   | C-   | D+   | D   | D-   | E   |
| Grade Points | 4.0 | 3.67 | 3.33 | 3.0 | 2.67 | 2.33 | 2.0 | 1.67 | 1.33 | 1.0 | 0.67 | 0   |

A C- will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

18. Make-up Exam Policy - Homework may not be turned in late without prior approval of the instructor. Make-up exams are given only for reasons of illness and in accordance with University of Florida regulations.

19. Honesty Policy – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

Cheating is a very serious offense and will not be tolerated. All instances of cheating, no matter how minor it may seem to you, will be reported to the Dean of Students Office and prosecuted. Penalties for cheating are severe and may include a grade of E for the semester. Actions that are considered cheating include, but are not limited to:

- Copying of homework solutions from another source or another student. Students are encouraged to work together to solve the homework, and thus it is expected that in some cases the homework solutions of two students will be the same. However, blatant copying can be identified and will be considered cheating.
- Copying from another student during an exam, or using disallowed resources (including programming information into a calculator) during an exam. Calculators will be spot-checked during exams.
- Plagiarism on any written assignment. Plagiarism is the practice of copying the text or information from other sources and presenting it as your own. Any phrase of more than four words that is taken directly from another text needs to be placed into quotation marks and properly attributed.
- Attempting to change answers or marked grades on homework assignments or exams after they have been graded and returned.
- Any other action which is an attempt to modify your grade for an assignment in a way that does not actually reflect your work or abilities.

20. Accommodation for Students with Disabilities – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

21. UF Counseling Services –Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
- Career Resource Center, Reitz Union, 392-1601, career and job search services.

22. Software Use – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.