

## Polymer Processing

EMA 4666, Section 04E8

**Class Periods:** Period 4: Tue(T)/Thur (R) 10:40 – 11:20 AM

Period 5: Thur (R) 11:35 AM – 12:20 PM

**Location:** TBA

**Academic Term:** Fall 2018

### **Instructor:**

Anthony B. Brennan, PhD

[abrennan@mse.ufl.edu](mailto:abrennan@mse.ufl.edu)

352-392-6281 (O) 352-219-8165 (C)

Office Hours: Mon: Period 4 & Thu: Period 6, 178 Rhines Hall

### **Teaching Assistants:**

Please contact through the Canvas website: [EMA 4666 Spring 2018](#)

- Ms. Jamie Murbach, [jam8744@ufl.edu](mailto:jam8744@ufl.edu), 501 NEB
  - Office hours: TBA

### **Course Description**

Major processing methods for polymers and polymeric composites as related to the rheological behavior of these systems. Synthesis of polymers via industrial processes.

### **Course Pre-Requisites / Co-Requisites**

EMA 3066

### **Course Objectives**

- Students will be able to:
  - Use their technical knowledge of materials science and engineering to understand the processing of polymers.
  - Design polymer processes within realistic physical constraints.
  - Perform and communicate in a professional environment.
  - Understand the societal impacts of polymer processing

### **Materials and Supply Fees**

NA

### **Professional Component (ABET):**

This course provides 1 credit towards engineering sciences

### **Relation to Program Outcomes (ABET):**

Outcome	Coverage*
a. Ability to apply knowledge of mathematics, science, and engineering to materials systems.	High
b1. Ability to conduct experiments, analyze and interpret data.	High
b2. Ability to conduct and analyze design of experiments (DOE).	Low
c. Ability to apply and integrate knowledge of structure, properties, processing, and performance to solve materials selection and design problems within realistic constraints.	High
d. Ability to function on multi-disciplinary teams.	Medium

e. Ability to identify, formulate, and solve engineering problems.	High
f. Understanding of professional and ethical responsibility.	High
g. Ability to communicate effectively in both oral and written form. {Inadequate detail on forms to reliably separate written vs. oral -- needs to be tabulated as one outcome, per list}	High
h1. Understanding of the economic impact of engineering solutions.	Medium
h2. Understanding of the global, societal, and environmental impact of engineering solutions.	Medium
i. Ability to engage in lifelong learning.	Medium
j. Knowledge of contemporary issues.	Medium

\*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not part of the course.

### **Required Textbooks and Software**

- Title: [Understanding Polymer Processing: Processes and Fundamental Equations](#)
- Author: Tim A.Osswald
- Publisher: Hanser Gardner
- Published: 1998 or 2010
- ISBN: 1-56990-262-3 or 978-1-56990-472-5 (Paperback recommended)
- Lecture notes provided on Website: CANVAS
  - Website: Canvas: [EMA 4666 Spring 2018](#)

### **Recommended Materials**

- Other materials: [EMA 4666 Spring 2018](#)
  - [Guide to Thermal Properties of Polymers](#)
  - [Equations Used in Polymer Physics](#)

### **Course Schedule**

See attachment to this Syllabus

### **Attendance Policy, Class Expectations, and Make-Up Policy**

Attendance is required to complete the lab assignments. Arrival on time is expected. Please turn off all cell phones upon entering 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. Students who do not comply with these requirements or who behave disorderly or disrespectfully may be asked to leave the classroom. Make up labs will be provided only with the **approval of the instructor in accordance with university policies.** Excused absences are consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation. In general, acceptable reasons for excused absence include illness, serious family emergencies, special curricular requirements, military obligation, court-imposed legal obligations, and religious holidays. In all cases, you will be required to provide written documentation, and obtain instructor approval. You will not be excused from any lab without following the policy above, with no exceptions. Students not in attendance for the scheduled lab will receive a score of zero.

### **Evaluation of Grades**

Assignment	Total Points	Percentage of Final Grade
Homework Sets (10)	10 each	10%
Quizzes (3)	15 each	15%
Design Project	100	15%

Exam 1	100	20%
Exam 2	100	20%
Exam 3	100	20%
	Total	100%

### ***Grading Policy***

<b>Percent</b>	<b>Grade</b>	<b>Grade Points</b>
93.1 - 100	A	4.00
89.8 - 93.0	A-	3.67
86.5 - 89.7	B+	3.33
83.2 - 86.4	B	3.00
79.9 - 83.1	B-	2.67
76.6 - 79.8	C+	2.33
73.3 - 76.5	C	2.00
70.0 - 73.2	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:  
<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

### ***Students Requiring Accommodations***

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

### ***Course Evaluation***

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

### ***University Honesty Policy***

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

NOTE: Any plagiarism identified with work submitted will result in a grade of zero "0" for the work. A report to the Dean of Students and a meeting with the instructor, a department representative from the MSE Academic Services Office and the student will be held to determine if any remedial action will be taken in addition to the grade assigned.

### ***Software Use***

All faculty, staff, and students 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.

### ***Student Privacy***

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

### ***Campus Resources:***

#### *Health and Wellness*

#### **U Matter, We Care:**

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

**Counseling and Wellness Center:** <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

#### **Sexual Assault Recovery Services (SARS)**

Student Health Care Center, 392-1161.

**University Police Department** at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

#### *Academic Resources*

**E-learning technical support**, 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu).  
<https://lss.at.ufl.edu/help.shtml>.

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

**Library Support**, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

**Teaching Center**, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.  
<https://teachingcenter.ufl.edu/>.

**Writing Studio, 302 Tigert Hall**, 846-1138. Help brainstorming, formatting, and writing papers.  
<https://writing.ufl.edu/writing-studio/>.

**Student Complaints Campus:** [https://www.dso.ufl.edu/documents/UF\\_Complaints\\_policy.pdf](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf).

**On-Line Students Complaints:** <http://www.distance.ufl.edu/student-complaint-process>.

**EMA 4666, Section 04e8**  
**Physical Polymer Science**  
**Tue (T)/Thur (R) Period 4 (10:40 – 11:20 AM) TBA**  
**Thu (R) Period 5 (11:45 AM – 12:35 PM) TBA**  
**3 CREDITS**

**Instructor:** Dr. A.B. Brennan  
**Office:** 178 Rhines Hall  
**Telephone:** 352.392.6281 (o)  
 352.219.8165 (m)  
**Email:** abrennan@mse.ufl.edu  
**Office hours:** Mon Period 3 Tue Period 6: and By Appointments  
**Website:** brennan.mse.ufl.edu

*HONOR CODE: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*

## COMPREHENSIVE FINAL EXAM

**Thursday, May 3, 2018**

**3:00 PM to 5:00 AM**

**Group 11E**

	Date	Day	WEEK 1	Assignment
1	1/9/18	Tue	Introduction	
2	1/11/18	Thur	Structure/Property Relationships	Read: Preface, Ch 1:
3	1/11/18	Thur	Cont'd	Review Chapter 2: "Polymers – Mechanical"
			<b>WEEK 2</b>	Homework #1 - Canvas
4	1/16/18	Tue	Structure Property cont'd	
5	1/18/18	Thur	cont'd	
6	1/18/18	Thur	cont'd	
			<b>WEEK 3</b>	
7	1/23/18	Tue	Newtonian Fluids	
8	1/25/18	Thur	cont'd	Read Ch 3,
9	1/25/18	Thur	cont'd	
			<b>WEEK 4</b>	Homework #2 – Canvas
10	1/30/18	Tue	cont'd	
11	2/1/18	Thur	Quiz	
12	2/1/18	Thur	cont'd	
			<b>WEEK 5</b>	
13	2/6/18	Tue	Rheology	
14	2/8/18	Thur	cont'd	Homework #3 - Canvas
15	2/8/18	Thur	cont'd	

			<b>WEEK 6</b>	
16	2/13/18	Tue	<b>EXAM 1 - Part 1</b>	
17	2/15/18	Thur	<b>EXAM 1 - Part 2</b>	
18	2/15/18	Thur	Extrusion	
			<b>WEEK 7</b>	Read Ch 4
19	2/20/18	Tue	Cont'd	
20	2/22/18	Thur	Cont'd	
21	2/22/18	Thur	Mixing Behavior	
			<b>WEEK 8</b>	Ch 5, Homework - Canvas
22	2/27/18	Tue	Cont'd	
23	3/1/18	Thur	Cont'd	Homework #4 - Canvas
24	3/1/18	Thur	Cont'd	Submit Design Project Topic by email
			<b>WEEK 9</b>	
25	3/6/18	Tue	Cont'd	
26	3/8/18	Thur	Cont'd	Homework #5 - Canvas
27	3/8/18	Thur	Injection Molding	
			<b>WEEK 10</b>	Read Chapter 6
28	3/13/18	Tue	Cont'd	
29	3/15/18	Thur	Cont'd	
30	3/15/18	Thur	Cont'd	
			<b>WEEK 11</b>	Homework #6 - Canvas
	3/20/18	Tue	SPRING BREAK	
	3/22/18	Thur	SPRING BREAK	
	3/22/18	Thur	SPRING BREAK	
			<b>WEEK 12</b>	
31	3/27/18	Tue	Film Production	
32	3/27/18	Thur	Cont'd	Read Chapter 7
33	3/29/18	Thur	Cont'd	
			WEEK 13	
34	4/3/18	Tue	<b>REVIEW</b>	
35	4/5/18	Thur	<b>EXAM II - Part 1</b>	
36	4/5/18	Thur	<b>EXAM II - Part 2</b>	
			WEEK 14	
37	4/10/18	Tue	Other processes	Read Chapter 8
38	4/12/18	Thur	Cont'd	Submit Design Project Outline
39	4/12/18	Thur	Cont'd	Homework #7 - Canvas
			WEEK 15	
40	4/17/18	Tue	Project Presentations	
41	4/19/18	Thur	Project Presentations	
42	4/19/18	Thur	Project Presentations	
			WEEK 16	
43	4/24/18	Tue	Project Presentations	
	<b>5/3/18</b>	<b>Thur</b>	Exam Week Group 3D - 3:00 to 5:00 PM	

This schedule is meant to identify the materials and times for the semester. However, there will be

**variations due to unforeseen circumstances. The actual lectures will be given at other times if the schedule is changed. The materials covered may vary depending upon student needs and abilities.**

**"Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation."**

NOTE: This schedule will serve as a guide to the subjects and approximate order in which they will be presented. However, in view of the interests of the class and available information subjects may be omitted and/or replaced. The dates are based upon the current academic calendar and will be adhered to as closely as possible. Every attempt will be made to re-schedule any lectures, which may be cancelled during this semester.