Engineering Faculty Document No. 42-19
May 20, 2019

TO: The Faculty of the College of Engineering

FROM: The Faculty of the Weldon School of Biomedical Engineering

RE: New Graduate Course, BME 68300, Polymers in Biomedical & Pharmaceutical Systems

The faculty of the Weldon School of Biomedical Engineering have approved the following new course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

BME 68300 Polymers in Biomedical & Pharmaceutical Systems
Term Offered: Fall or Spring, Lecture 3, Cr. 3
Prerequisite: None

Description: This course is designed to provide backgrounds in basic polymer chemistry, synthesis, characterization, solution properties, and recent advances in polymers for applications in drug delivery, biomedical devices, tissue engineering, biotechnology, and nanotechnology.

Reason: This course will teach students key background knowledge for research careers using polymers in fields such as tissue engineering, pharmacy and biotechnology. Students will gain a detailed understanding about the physics of polymer solutions to facilitate the design and engineering of polymeric systems. The course will highlight the uses of polymer systems for clinical applications, food sciences and controlled release in pharmaceutical applications and sensor design. It has been taught as BME 69500 for more than 6 terms in 2010, 2012, 2014, 2016, 2017 and 2019 with 10, 14, 16, 16, 15 and 35 students respectively.

George R. Wodicka

George R. Wodicka,
Dane A. Miller Head and Professor
Weldon School of Biomedical Engineering

BME 695
(3-Credit)

Polymers in Biomedical & Pharmaceutical Systems

Instructor: Professor Luis Solorio (lsolorio@purdue.edu) Office: MJIS 3019
Professor Kinam Park (kpark@purdue.edu) Office: MJIS 3070

Lectures Tues/Thurs, 6:00 pm – 8:50 PM. MJIS 1083

Objective: This course is designed to provide backgrounds in basic polymer chemistry, synthesis, characterization, solution properties, and recent advances in polymers for applications in drug delivery, biomedical devices, tissue engineering, biotechnology, and nanotechnology.

Lecture Materials:
Lecture materials will be posted in PDF format for downloading.

Grading: Students are expected to read all handout materials, do homework, and prepare a written report at the end of the semester. Each student will have a chance to present the contents of the written report in a 10-min presentation in the class. Each student can choose a special topic of their choice upon consultation with the instructors. The research report and presentation are designed to train students how to collect, analyze, and utilize information on a research topic and to improve their presentation skills.

The following is an example of the contents of the report:

1. Statement of the problems, or specific aims of your research (or your report)
2. Background (i.e., review of the relevant field to show what are known and what need to be known).
3. Experimental (you may not do any experiments, but you may describe what kinds of experiments may be done, or can be done to obtain the results you are looking for).
4. Results (or the summary of findings from your literature search).
5. Discussion (what do the results mean? what extra experiments need to be done? what will be the future in this area, etc.)
6. Conclusions (or summaries).

Learning Outcomes

- Understand polymer synthesis and characterization techniques
- Utilize Flory-Huggins theory of solutions to describe the polymer free entropy and enthalpy.
- Use thermodynamics to describe the design of smart polymer systems
- Describe the properties that make a material biocompatible
- Understand how to design drug delivery systems
- Design experiments to characterize nano-scale polymeric platforms

Course Outline

#	Date	Lecture Contents
1.	1/8	Course Philosophy & History of Polymers (KP)
2.	1/10	Polymers in Everyday Life (KP)
3.	1/15	Polymer Synthesis & Characterization (LS)
4.	1/17	Water and Colloids (KP)
5.	1/22	Theory of Polymer Solutions (LS)
6.	1/24	Smart Polymers and Hydrogel (LS)
7.	1/29	Drug Delivery and Pharmaceutics (KP)
8.	1/31	Advanced Drug Delivery Systems (KP)
9.	2/5	Biomaterials (LS)
10.	2/7	Tissue Engineering (LS)
11.	2/12	Journal Article, Proposal, and Patent (KP)
12.	2/14	Biotechnology (KP)
13.	2/19	Nanoscience (LS)
14.	2/21	Nanotechnology (LS)
15.	2/26	Student Presentations/Round table discussion (LS, KP)

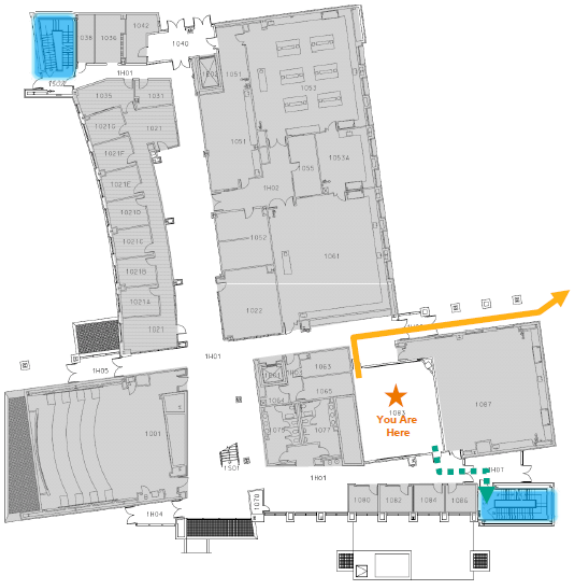
Note: The lecture schedule may change.

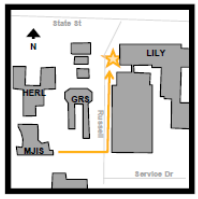
Emergency: In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. You will be notified by e-mails from the instructors.

MJIS 1083

Updated: Fall 2010

Evacuation and Shelter-In-Place Procedures





Emergency Assembly Area

In case of Violence:
If incident is occurring in your building, call 911 if possible.

If possible, seek shelter in a lockable or securable room, preferably without windows.

In case of Fire:
Calmly follow the solid gold path ▬ to exit the building, assemble 100ft from the NORTHEAST end of the building. (In case of inclement weather assemble in the Northeast hall of LILY)

In case of fire, elevators will not operate.

In case of Shelter-in-Place-Weather-Related Emergencies:
Calmly follow the dotted teal path ▪▪▪ to the closest stairwell, take it to the BASEMENT and find a shelter location

Evacuation Procedures

- You are in a facility used for research; it is possible that the evacuation horn will sound.
- This is a very loud INSIDE alarm.
- Please walk calmly out of the building and gather outside near the Northwest end of LILLY.
- Stay in West of Russell St. until a police officer gives the all clear.
- It is extremely dangerous to enter a building in the middle of an emergency.
- It is the responsibility of the faculty and staff to execute this emergency plan upon hearing the evacuation siren.

All Hazards Emergency Warning Sirens

- A weather emergency, such as a tornado, will activate the "shelter in place" siren.
- This is a less audible OUTSIDE, area-wide siren.
- Please seek shelter in the basement area.