

Time: Tuesday & Thursday 1:25 to 3:55 PM
Room: 177 Physics
Organizer & co-instructor: Xiang-qiang (Rosie) Chu, Assistant Professor
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Learning Outcomes:

- Learn the methodology of scientific research.
- Get familiar with experimental methods used in the field of Biomedical Physics and Biophysics.
- Understand fluorescence and imaging techniques, atomic force microscopy (AFM) and protein crystallography;
- Develop skills such as:
 - Experiment designing and problem solving;
 - Protein manipulation, including protein crystallization;
 - Basic skills of bench work, such as pipetting, measuring mass and making buffer;
 - Interpretation and analysis of experimental data;
 - Writing scientific papers and technical reports;
 - Presenting professional seminars.

Syllabus: The course consists of several scientific lectures, lab tours and hands-on research projects conducted under the guidance of a faculty member. The lectures will take place at the indicated days and times. A quiz will be given in the class after the presentation of materials and will be graded by the faculty member presenting the lecture. Before the semester projects start, students will be divided into groups consisting of three members. Each group will work on two or three research projects. At the end of the semester, each student will write lab reports and make a seminar presentation. One of the reports should have the format of a scientific paper and must follow the guidelines of technical writing. Below is the schedule for the lectures and tentative titles:

1/13 ~ 3/5 Biomedical Physics research lectures with research projects

1/13 (Tu): Introduction of the course, data analysis and reduction (Prof. Rosie Chu)

1/15 (Th): Data analysis and reduction (Prof. Zhi-Feng Huang)

1/20 (Tu): Basic principle and application of MRI (Prof. Yongquan Ye, Department of Radiology)

1/22 (Th): MRI lab tour in Department of Radiology, Medical School

1/27 (Tu): Biophysics: single molecule study (Prof. Takeshi Sakamoto)

1/29 (Th): Electrospinning technology and quantification of nanofiber matrix
(Prof. Weiping Ren, Department of Biomedical Engineering)

2/3 (Tu): Single molecule force measurement with atomic force microscopy (Prof. Peter Hoffman)

2/5 (Th): Prof. Mohammad Mehrmohammadi (Department of Biomedical Engineering)

2/10 (Tu): Library/research methods training (Dr. Jim Van Loon, Wayne State University Library System)

2/12 (Th): Biochemistry lab training (Prof. Rosie Chu), 1st class of project

2/17 (Tu): Prof. Mohammad R.N. Avanaki (Department of Biomedical Engineering)

2/19 (Th): Lab tour in the Department of Biomedical Engineering

2/24 (Tu): Projects continue, getting familiar with the instruments

2/26 (Th): Projects

3/3 (Tu): Near-field and localization microscopes for measuring plasma membrane organization (Prof. Christopher Kelly)

3/5 (Th) ~ 4/21 (Tu): Experimental projects continue

3/17 & 3/19: No class, spring break

4/16 (Th): Biomedical Physics course Assessment (MCAT-Type exam)

4/21 (Tu): Written project report due.

4/28 (Tu): Final presentation

Grading:

Quizzes: 40 points

Attendance: 5 points

MCAT-Type Exam: 5 points

Final project: Written part: 30 points Oral presentation: 20 points.

Each student will be evaluated separately for his/her own contribution for the project.

Total: 100 points

The overall course grade will be determined on the basis of the following table:

| Grade | Cumulated score | Grade | Cumulated score | Grade | Cumulated score |
|--------------|------------------------|--------------|------------------------|--------------|------------------------|
| A | 90 – 100 | B- | 70 – 74 | D+ | 50 – 54 |
| A- | 85 – 89 | C+ | 65 – 69 | D | 45 - 49 |
| B+ | 80 – 84 | C | 60 – 64 | D- | 40 - 44 |
| B | 75 - 79 | C- | 55 - 59 | F | 0 – 39 |