

(Revised 2/6/17)

**Time:** Tuesday & Thursday 1:00 to 3:30 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:

**1/10 ~ 2/23 Biomedical Physics Research lectures with research projects**

1/10 (Tu): Introduction of the course, data analysis and reduction (Prof. Rosie Chu)

1/12 (Th): Data analysis and reduction (Prof. Rosie Chu)

1/17 (Tu): Near-field and localization microscopes for measuring plasma membrane organization (Prof. Christopher Kelly)

1/19 (Th): Library/research methods training (Mr. Jim Van Loon, Wayne State University Library System)

1/24 (Tu): Single molecule force measurement with atomic force microscopy (Prof. Peter Hoffman)

1/26 (Th): Biophysics: single molecule study (Prof. Takeshi Sakamoto)

1/31 (Tu): Thermodynamics of Biomolecules (Prof. Korosh Torabi, Department of Chemical Engineering)

2/2 (Th): Discovery of the porosome: The supramolecular secretory portal in cells (Prof. Bhanu P. Jena, Dept. of Physiology, School of Medicine)

2/7 (Tu): Math model of cell injury (Prof. Donald Degracia, Department of Physiology)

2/9 (Th): Neutron scattering for biomedical research (Prof. Rosie Chu)  
 2/14 (Tu): Students' presentations (Sergio Rodriguez and Nicole Witzleben)  
 2/16 (Th): No class  
 2/21 (Tu): Prof. Mohammad R.N. Avanaki (Department of Biomedical Engineering)  
 2/23 (Th): X-ray crystallography (Prof. Zhe Yang, School of Medicine)  
 2/28 (Tu): Principles and Applications of magnetoencephalography (MEG):  
 A unique look into your brain function (Dr. Susan Bowyer, Henry Ford Health System)  
 3/2 (Th): Lab tour of MEG lab, Henry Ford Hospital

**3/7 (Tu) ~ 4/18 (Tu): Experimental projects continue**

3/7 (Tu): Introduction to the projects and lab training (Prof. Rosie Chu)  
 3/9 (Th): No class  
 3/14 & 3/16: No class, spring break  
 4/11 (Tu): Biomedical Physics course Assessment (MCAT-Type exam)  
 4/18 (Tu): Written project report due.  
 4/18 (Tu) & 4/20 (Th): 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