

BME 655-001

Advanced Characterization of Biomaterials

Schedule and Requirements

M,W 10:00 to 11:25 AM

Fenster Hall Rm 698

Professor Willis Hammond

201 Tiernan Hall

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7/4/13

BME 655-001

Goals

The goal of BME 655 is to provide students with knowledge of the materials characterization techniques that are appropriate or unique to biomaterials. This course will explore the methods used by top scientists to discover the structures of proteins, enzymes, DNA, and carbohydrates at the molecular level, as well as complex structures such as collagen, the chromosome, and the cell. Topics will include protein and DNA sequencing, separation methods and spectroscopies such as 3D x-ray diffraction, 2D NMR and microscopic imaging techniques. The course is intended to introduce you, the student, to what can be done and inspire you to explore new methods of analysis that relate to your research interests. It is not expected that you will become expert in these techniques or the background science in detail, only that you have a strong underpinning for future problem solving.

Sources

- “Principles of Instrumental Analysis” 6th ed. Skoog, Holler & Crouch, 2007 (on reserve)
- Primary literature
- Internet
- References on library reserve as needed

BME 655-001 Class Schedule

Lec.	Day	Date	Topic	Tests
1	Wed.	9/4/13	Introduction	
2	Mon.	9/9/13	Electromagnetic Radiation	
3	Wed.	9/11/13	Optical Microscopy	
4	Mon.	9/16/13	Confocal & SEM Microscopy	
5	Wed.	9/18/13	STM/AFM, IR/Raman	Quiz
6	Mon.	9/23/13	IR/Raman, NMR	
7	Wed.	9/25/13	NMR	
8	Mon.	9/30/13	MassSpec	
9	Wed.	10/2/13	Thermal Analysis	Quiz
10	Mon.	10/7/13	Phases/x-ray/light scattering	
11	Wed.	10/9/13	Separations	
12	Mon.	10/14/13	GC/HPLC/GPC	
13	Wed.	10/16/13	Fine Points of Separations	
14	Mon.	10/21/12		Midterm

BME 655-001 Class Schedule

Lec.	Day	Date	Topic	Tests
15	Wed.	10/23/13	IC/IEC/Electrophoresis	
16	Mon.	10/28/13	Insulin/Myoglobin	
17	Wed.	10/30/13	2D-NMR,	
18	Mon.	11/4/13	Mol. Modeling	Quiz
19	Wed.	11/6/13	Collagen	
20	Mon.	11/11/13	Protein	
21	Wed.	11/13/13		
22	Mon.	11/18/13	Silk	
23	Wed.	11/20/13	DNA/RNA	Quiz
24	Mon.	11/25/13	Antibodies	
25	Wed.	12/2/13	ELISA	
26	Mon.	12/9/13	Carbohydrates	
27	Wed.	12/11/13	Review, Paper Due	Quiz
	Thurs.	12/20/12	FMH 106, 2:30 – 5:00 pm	Final

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Grading

Grade	Comment	%
Quiz	1/2 hour (best 4 of 5)	20
Midterm		20
Paper	Structure determination of a Biomaterial	20
Final		40

BME 655-001 Paper

- Select a Published Research Paper
 - On a BioMaterials related subject
 - Which uses multiple analytical techniques (≥ 4)
 - Describe how each technique contributed to the conclusions of the paper
 - Suggest additional methods that could be used
 - or
- Write a review of an analytical method not discussed in the course

BME 655-001 Paper

- 5-10 pages in length
- Use references where appropriate
- If not referenced, must be your original writing
- Please have topic approved by me
- Papers due Dec. 10.
- Please submit copy of published research paper with your paper
- Electronic submission encouraged.

Academic Integrity Policy

- Students are expected to comply with the