

**APPENDIX IC: SYLLABUS FOR 20 BME 2010 RESEARCH METHODS IN
BIOMEDICAL ENGINEERING (SUMMER SEMESTER 2014)**

Course Description: Required for all Biomedical Engineering students

Catalog Description: This course will help students to develop methods and skills necessary to create, develop and execute a successful research project. The material covers an introduction in the scientific methods with in depth discussion of case studies from several topics of biomedical engineering.

Prerequisites: Differential Equations; Introductory computer programming. BIOL1081L & CHEM1041L
Or 15BIOL101 & 15BIOL111 & 15CHEM101 & 15CHEM111

Required Texts:

- 1) A Beginner's Guide to Scientific Method, 4th Edition by Stephen S Carey, Wadsworth Cengage Learning, c2012
- 2) Introduction to Biomedical Engineering [electronic resource] / [edited by] John Enderle, Joseph D. Bronzino, Academic Press, c2012
- 3) Matlab

Optional Reading:

- 1) The art of scientific investigation, William IB Beveridge, Blackburn Press, 2004
- 2) Biomedical engineering [electronic resource] : bridging medicine and technology / W. Mark Saltzman, Cambridge University Press, 2009
- 3) The biomedical engineering handbook [electronic resource] / edited by Joseph D. Bronzino, CRC/Taylor & Francis, 2006

Instructor:

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Office Hours: 2:00-2:45pm MW, or by appointment

Learning Objectives: Upon completion of this course, students will be able to:

1. Communicate legal and ethical issues in biomedical research.
2. Overview the stages of a research project from proposal through to publication, and processes used to evaluate the research.
3. Demonstrate written and oral scientific communication skills.
4. Perform appropriate statistical analyses on biomedical data.
5. Give an account of evidence-based medicine and clinical audit.

Class Schedule: Class meets MWF at 1:00 – 2:00, RECCENTR 3230

Attendance Policy: Attendance is not required but strongly recommended.

Grading Policy:

- Weekly Quiz: 25%
- Midterm Exam #1 25%
- Midterm Exam #2 25%
- Final Exam 25%

Missed Exam Policy: Students will not be allowed to make up a missed exam unless he/she has provided an excusable absence prior to the exam date.

Schedule of Lectures and Reading Materials

Date	Topic	Examinations
May 12	Class organization	
	The Scientific Method	
	Science & Observation	
	Explanation & Experimentation	Q1
	Establishing causal links	
	Fallacies in Science	
May 28	Midterm Exam #1	MT1
	Moral and Ethical issues	Q2-Q5
	Anatomy and Physiology	
	Biomechanics	
	Biomaterials	
	Tissue Engineering	
	Compartmental modeling	
July 2	Midterm Exam #2	MT2
	Biochemical reactions and enzyme kinetics	Q6-Q7
	Bioinstrumentation and Sensors	
	Bioelectric phenomena and signal processing	
	Biomedical mass transport	
	Radiation and Medical Imaging	
July 30	Final Exam	Final