

**BME 4503/5500      Biomedical Instrumentation**  
**Fall 2015 (Sections 01AF/5674)**

1. **Catalog Description (3 credit hours)** – This course covers engineering and medical bases of application, measurement and processing of signals to and from living systems. Biomedical transducers for measurements of movement, biopotentials, pressure, flow, concentrations, and temperature are discussed, as well as treatment devices such as ventilators and infusion pumps.
2. **Pre-requisites** MAC 2313, MAP 2302 and PHY 2049  
**Co-requisite** (BME 4503 only) – BME 4503L
3. **Course Objectives:** Students will gain understanding of
  - sensor principles, rationales, and designs
  - design principles as they apply to measurements on the human body
  - instrumentation regulation and safety considerations
4. **Accreditation Requirement Contributions (ABET: <http://www.abet.org>)**  
This course covers 3 credits of engineering topics.  
It leads to increased student abilities to:
  - apply knowledge of mathematics, science, and engineering
  - identify, formulate, and solve engineering problems
5. **Instructor:** Dr. Kevin J. Otto
  - a. Office location – 363 NEB
  - b. Telephone – 352-294-2227
  - c. E-mail address – [kevin.otto@bme.ufl.edu](mailto:kevin.otto@bme.ufl.edu)
  - d. Office hours- weekly by e-learning announcement or by e-mail appointment
6. **Teaching Assistant** - Ms. Antonietta Restuccia
  - a. Office location – J-243 BMS
  - b. E-mail address - [arestuccia@ufl.edu](mailto:arestuccia@ufl.edu)
  - c. Office hours- weekly by e-learning announcement or by e-mail appointment
7. **Meeting:** MWF Period 7: 1:55 to 2:45 pm RNK 0110, Rinker Hall.
8. **Class Schedule:** Topic schedule, assignments, quizzes, exams announced via e-learning site.
9. **Fees** - none
10. **Textbook:** Webster, John G. Medical Instrumentation: Application And Design. ISBN: 0471676004. Any Edition. 4<sup>th</sup> Edition is 2010. Publisher: John Wiley & Sons
11. **Recommended Reading** – supplemental material provided via e-learning site (Canvas). Students are encouraged to use Matlab for calculations as needed.
12. **Class Web Site** -- E-learning; Canvas (gatorlink login)

13. **Course Outline:** Subject to change and reordering. Check e-learning course site for updates

- a. Basic concepts of medical instrumentation (Ch. 1)
- b. Basic sensors and principles (Ch. 2)
- c. Amplifiers and signal processing (Ch. 3)
- d. The origin of biopotentials (Ch. 4)
- e. Biopotential electrodes (Ch 5)
- f. Biopotential amplifiers (Ch. 6)
- g. Blood pressure, flow, volume, and sound (Ch. 7/8)
- h. Measurements of the respiratory system (Ch. 9)
- i. Chemical biosensors (Ch. 10)
- j. Clinical laboratory instrumentation (Ch. 11)
- k. Therapeutic and prosthetic devices (Ch. 13)
- l. Electrical safety (Ch. 14)

14. **Attendance and Expectations:** Attendance is required for all scheduled lectures unless others noted by an e-learning announcement. Students should not use cell phones, tablets, computers etc. to attend to non-course activities during lecture. Note taking via electronic devices is acceptable; however, be advised that distractions that are not course related will be recognized and will be reflected in the below mentioned participation grades.

15. **Grading:** There will be two in-class exams during the term, a comprehensive final exam (during the assigned final exam time period; 12/16 3 pm- 5 pm), plus one final project. Each will comprise 20% of the grade. Homework will comprise the balance (20%). Selected, but not advertised, homework problems will be graded. The project will be a team project including a final report and presentation. Teams will be assigned and more details will be announced in class.

All component grades will be converted to an A/B/C/D/F (+/-) basis and averaged. Each assignment will be curved to the best professional judgment of the instructor. BME 4503 and 5500 students will receive related but different assignments and be graded separately on the differing sections.

16. **Grading Scale:** Standard (+/-) letter grade basis: A/B/C/D/F = 4, 3, 2, 1, 0. “+” increases the grade by 1/3 and “-“ decreases it by 1/3. A final A+ grade is awarded a grade of A per UF grading rules. Please note how C- or B- grades affect undergraduate and graduate students.

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A C- will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better).

Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement.

*BME 5500*

Graduate students, in order to graduate, must have an overall GPA of 3.0 or better (B or better). Note: a B- average is equivalent to a GPA of 2.67, and therefore, it does not satisfy this graduation requirement. Undergraduate students taking BME 5500 are subject to the same restrictions as for BME 4053.

For more information on grades and grading policies, please visit:

For UG Students: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

For Grad Students: <http://gradcatalog.ufl.edu/content.php?catoid=6&navoid=1219#grades>

17. **University Exam/Attendance Requirements:** The university requirements for class attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at:  
<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

18. **Honesty Policy** – UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Note that failure to comply with this commitment will result in disciplinary action compliant with the UF Student Honor Code Procedures.

See <http://www.dso.ufl.edu/sccr/procedures/honorcode.php>

19. **Accommodation for Students with Disabilities** – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.
20. **UF Counseling Services** –Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
- UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, <http://www.counseling.ufl.edu/cwc/Default.aspx>, counseling services and mental health services.
  - Career Resource Center, Reitz Union, 392-1601, career and job search services.
  - University Police Department 392-1111
21. **Software Use** – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.
22. **Course Evaluation/Feedback:** Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.