ECE 438-001 Introduction to Medical Instrumentation
Fall 2014

Instructor: Jun Qin, Ph.D.  Office: ENGR E-207
Email: jqin@siu.edu  Office Phone: 618-453-3460

Office Hours: MWF, 1:00 - 2:00 p.m. or by appointment
Lecture: MWF, 2:00 – 2:50 p.m., ENGR A-320
Lab: TBA

Grading/Evaluation:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
</tr>
<tr>
<td>Projects</td>
<td>24%</td>
</tr>
<tr>
<td>Attendance</td>
<td>12%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>16%</td>
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<tr>
<td>Final Exam</td>
<td>28%</td>
</tr>
</tbody>
</table>

A: 85-100; B: 70-84; C: 60-74; D: <60

Classroom Policies:

A. Attendance Policy: Attendance will be taken 6 times at random throughout the semester, and it will be counted toward the final grade. Students are responsible for all announcements made in class and/or posted to D2L.

B. Late Homework/Missed Exams: Late homework is not accepted. If an exam is missed for a legitimate reason, a grade will be assigned based on the remaining homework/exams.

C. Mobile Technology Policy: N/A.
ECE 438-001 Syllabus Fall 2014

1. **Course number and name**: ECE 438-001 Introduction to Medical Instrumentation
2. **Credits and contact hours**: 3 credits, Three 50-minute session per week, Four 2-hour session computer labs in ECE PC lab E-136.
3. **Course Committee**: J. Qin, and other ECE faculty
4. **Text book(s), title, author, and year**:

   **References or other supplemental materials**:
   [3] LabVIEW six hours course, National Instruments Inc.,

5. **Specific course information**
   a. (catalog description): This course introduces the students to the field of medical instrumentation. This course will focus on fundamentals of instrumentation systems, sensors, amplifiers, and signal precondition. In addition, the course also includes design and applications of medical instrumentation, biopotential measurement, biosensor, biomedical signal processing, and other related topics.
   b. prerequisites or co-requisites: ECE355 or equivalent
   c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program: Elective course for EE and CpE majors
   d. Professional Component {Credit Hours}
      Mathematics 0 Sciences 0 General Ed. 0
      Eng. Science  3 Eng. Design  1

6. **Instructional Objectives (with SO’s), ex. The student will be able to explain the significance of current research about a particular topic. (a, b, e, k)**
   The student is expected to have a clear understanding of:
   1. The concept of medical instrumentation systems (a).
   2. Characteristics of medical instrumentation systems (a, e).
   3. The principles and applications of sensors (a, e).
   4. The basic principles of amplification and filtering (a, e).
   5. The principles of biopotential and biosensors (a, e).
   6. The concept of data acquisition and precondition (a, e).
   7. Simulation of medical instrumentation systems using LabVIEW (b, k)

7. **Brief list of topics (class, lab and project) to be covered (with hours)**
   a. Classroom Topic (Hours)
      • Biomedical instrumentation overview {2}
      • Generalized instrumentation system {1}
      • Characteristics of medical instrumentation system {3}
      • Basic Sensors principles and applications {5}

1 subject to change at the instructor’s discretion. Students are responsible for announcements made in class and on D2L.
ECE 438-001 Syllabus Fall 2014

• Amplification and filtering {5}
• Biopotential Electrodes {5}
• LabVIEW Programming {2}
• Data analysis using LabVIEW {2}

b. Laboratory Topics (Hours)
1. Data Simulation and Analysis {8}
2. Program Structures in LabVIEW {8}
3. Waveform Simulation, Array & Cluster, and Graph Control in LabVIEW {8}

8. CAD and Computer Tools Used: LabVIEW
9. Assessment of the Contribution to Student Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
<th>h</th>
<th>i</th>
<th>j</th>
<th>k</th>
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</thead>
<tbody>
<tr>
<td>Assessed</td>
<td>x</td>
<td>x</td>
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<td>x</td>
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Student Outcomes (ABET criteria a-k) are quoted here:

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
University Policies

A. **Incomplete Grades:** An INC is assigned when, for reasons beyond their control, students *engaged in passing work* are unable to complete all class assignments. An INC must be changed to a completed grade within a time period designated by the instructor but not to exceed one year from the close of the term in which the course was taken, *or graduation*, whichever occurs first. Should the student fail to complete the course within the time period designated, not to exceed one year, or graduation, whichever comes first, the incomplete will be converted to a grade of *F* and the grade will be computed in the student’s grade point average. Students should not reregister for courses in which an INC has been assigned with the intent of changing the INC grade. Re-registration will not prevent the INC from being changed to an *F*.

B. **Academic Integrity:** You are expected to submit your original work and adhere to the academic policies as stated in the SIU Student Conduct Code: [http://srr.siu.edu](http://srr.siu.edu) (listed under Additional Links). Any act of academic dishonesty, cheating, or plagiarism in any form, including anonymous internet sources used in student papers, will be reported. These acts are taken seriously and the consequences may range from failing an assignment to expulsion from the university.

C. **SIU Email:** Your SIU email account is an official form of University communication. Your instructor will use SIU email as a primary means of electronic communication with students. Please make sure that you maintain a valid password and acquire the habit of regularly checking your SIU email account for important instructor and University announcements. You may view the official SIU Student Email Policy at: [http://policies.siu.edu/policies/email.html](http://policies.siu.edu/policies/email.html).

D. **Emergency Procedures:** SIU is committed to providing a safe and healthy environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with SIU Emergency response Plan and building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, available on BERT’s website at [http://www.bert.siu.edu/](http://www.bert.siu.edu/), the SIU Department of Public Safety’s website [www.dps.siu.edu](http://www.dps.siu.edu) (disaster dropdown and video, “Shots Fired”), and in the Emergency Response Guideline pamphlet. Know how to respond to each type of emergency. Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. **It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency.** The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.
E. **Supplementary Assistance:** SIU is committed to assisting students with disabilities. With the cooperation of SIU’s Disability Support Services (DSS), each student who qualifies for reasonable supplementary assistance has the right to receive it. Students requesting supplementary assistance must first register with DSS in Woody Hall, B-150, 618-453-5738 or 618-453-2293 (TTY), by email DSS@siu.edu, or http://disabilityservices.siu.edu/. Notice: If you have any type of special need(s) or disability for which you require accommodations to promote your learning in class, please contact me as soon as possible. The Office of Disability Support Services (DSS) offers various support services and can help you with special accommodations. You may wish to contact DSS to verify your eligibility and options for accommodations related to your special need(s) or disability.

**Student Services**

A. **Learning Support Services:** The Center for Learning Support Services (CLSS) assists students of all cultures, abilities, backgrounds and identities with enhancing their self-management and interdependent learning skills. Programs offered by CLSS include: group study sessions; math tutoring; academic coaching; early intervention program; and study skills seminars. For additional information please contact CLSS in Woody Hall, Room A-313, 618-453-2925, or www.tutoring.siu.edu.

B. **Writing Center:** The Writing Center offers free tutoring services and assistance with improving writing skills to all SIU undergraduate students and faculty. For center locations and hours, to schedule an appointment online, and to view information regarding the Online Writing Lab (OWL) contact the Writing Center at 618-453-1231 (Morris Library location); 618-453-2927 (Trueblood location), or www.write.siu.edu.

C. **Saluki Cares:** The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress-physical, emotional, financial or personal. By working closely with faculty, staff, students and their families, SIU will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. To make a referral to Saluki Cares click, call or send: http://salukicares.siu.edu/index.html; 618-453-5714, or siucares@siu.edu.
Syllabus Attachment
Fall 2014

IMPORTANT DATES *
Semester Class Begins ........................................ 08/18/2014
Last day to add a class (without instructor permission): 08/24/2014
Last day to withdraw completely and receive a 100% refund: 08/31/2014
Last day to drop a course using SalukiNet: ................... 10/26/2014
Last day to file diploma application (for name to appear in Commencement program): ........................................ 10/31/2014
Final examinations: .............................................. 12/8–12/12/2014

Note: For outreach, internet, and short course drop/add dates, visit Registrar’s Academic webpage: http://registrar.siu.edu/

FALL SEMESTER HOLIDAYS
Labor Day 09/01/2014
Fall Break 10/11—10/14/2014
Veterans Day 11/11/2014
Thanksgiving Vacation 11/26—11/30/2014

WITHDRAWAL POLICY ~ Undergraduate only
Students who officially register for a session may not withdraw merely by the stopping of attendance. An official withdrawal form needs to be initiated by the student and processed by the University. For the proper procedures to follow when dropping courses and when withdrawing from the University, please visit http://registrar.siu.edu/pdf/ugradcatalog1314.pdf

INCOMPLETE POLICY ~ Undergraduate only
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REPEAT POLICY
An undergraduate student may, for the purpose of raising a grade, enroll in a course for credit no more than two times (two total enrollments) unless otherwise noted in the course description. For students receiving a letter grade of A,B,C,D, or F, the course repetition must occur at Southern Illinois University Carbondale. Only the most recent (last) grade will be calculated in the overall GPA and count toward hours earned. See full policy at http://registrar.siu.edu/pdf/ugradcatalog1314.pdf

GRADUATE POLICIES
Graduate policies often vary from Undergraduate policies. To view the applicable policies for graduate students, please visit http://gradschool.siu.edu/about-us/grad-catalog/index.html

DISABILITY POLICY
Disability Support Services provides the required academic and programmatic support services to students with permanent and temporary disabilities. DSS provides centralized coordination and referral services. To utilize DSS services, students must come to the DSS to open cases. The process involves interviews, reviews of student-supplied documentation, and completion of Disability Accommodation Agreements. http://disabilityservices.siu.edu/

PLAGIARISM CODE

SALUKI CARES
The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress—physical, emotional, financial, or personal. By working closely with faculty, staff, students and their families, SIU will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. For Information on Saluki Cares: (618) 453-5714, or siucares@siu.edu, http://salukicares.siu.edu/index.html

EMERGENCY PROCEDURES
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INCLUSIVE EXCELLENCE
SIU contains people from all walks of life, from many different cultures and sub-cultures, and representing all strata of society, nationalities, ethnicities, lifestyles, and affiliations. Learning from and working with people who differ is an important part of education as well as an essential preparation for any career. For more information please visit: http://www.inclusiveexcellence.siu.edu/

MORRIS LIBRARY HOURS
http://www.lib.siu.edu/about

LEARNING AND SUPPORT SERVICES
Help is within reach. Learning support services offers free tutoring on campus and math labs. To find more information please visit the Center for Learning and Support Services website:
Tutoring: http://tutoring.siu.edu/
Math Labs http://tutoring.siu.edu/math_tutoring/index.html

WRITING CENTER
The Writing Center offers free tutoring services to all SIU students and faculty. To find a Center or Schedule an appointment please visit http://write.siu.edu/

AFFIRMATIVE ACTION & EQUAL OPPORTUNITY
Our office's main focus is to ensure that the university complies with federal and state equity policies and handles reporting and investigating of discrimination cases. For more information visit: http://diversity.siu.edu/

Additional Resources Available:
SALUKINET: https://salukinet.siu.edu/cp/home/displaylogin
ADVISEMENT: http://advisement.siu.edu/


Fall 2014 R.O'Rourke