

## **Course Syllabus**

### **SIE 503: Human-Computer Interaction: Experimental Design**

#### **Instructor:**

Dr. Nicholas Giudice

Spatial Informatics Program: School of Computing and Information Science and Virtual Environment and Multimodal Interaction Laboratory (VEMI Lab)

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#### **Office Hours:**

Office hours for this course will be by appointment: students are welcome to contact me by email to arrange a time to meet in person or by phone/Skype.

#### **Course Description:**

HCI Experimental Design is an interdisciplinary course designed primarily for advanced undergraduates and first or second year graduate students who plan to engage in scientific research with emerging technologies. Students use and gain familiarity with virtual reality, augmented reality, haptic, audio, indoor guidance, and additional emerging computing-based communication, visualization, and mobile technologies. To improve human interfaces with such technologies, the course covers topics in: (1) preparation of experiments, (2) design of experiments, (3) modern experimental techniques and instrumentation, (4) data collection, organization, and basic statistical analysis techniques, and (5) writing up experiment results and “telling the story”.

Credits: 3

**Prerequisites:** Introductory computer programming course and permission of instructor

#### **Course Objectives:**

1. Gain familiarity with emerging and evolving computing-based communication, visualization, and mobile/navigational technologies.
2. Gain an understanding of how to perform rigorous scientific research, and the issues that are important to consider in the research process.
3. Engage in team-based and project-based learning.

4. Become better able to evaluate the quality of others' research and think critically about what scientific evidence means in a variety of contexts.
5. Develop an appropriate research question/problem.
6. Design and conduct your own research project.
7. Generate an appropriate statistical plan to support a proposition.
8. Build your experience with scientific communication by writing and speaking about your research and reading about others' research.

**Course texts:**

**Required:**

Leedy, P. and Ormrod, J. (2013). Practical Research: Planning and Design 10<sup>th</sup> Ed. Pearson Education Inc. ISBN: 978 0 13 269324 0

**Recommended:**

Kanji, G. (2006). 100 Statistical Tests. Sage Publications Ltd. ISBN: 0 7619 6152 6

Morgan, S., Reicher, T. & Harrison, T. (2002). From Numbers to Words. Allyn and Bacon. ISBN: 0 8013 3280 X

**Grading, Class Policies, and Course Expectations:**

Grades in this course will be based on class participation, as well as the quality and completion of all class assignments, exams, and papers/projects listed on the syllabus.

**Note:** As we are incorporating a component of interviewing / experimentation for the class project, all students need to complete the online module for protection of human subjects from the UMaine Institutional Review Board (IRB). If students have not previously taken this course, they must complete the module in the first 2 weeks of the semester. The web-based tutorial can be found at:

<http://www.umaine.edu/research/research-compliance/institutional-review-board-for-the-protection-of-human-subjects-irb/required-training/>

You are expected to exhibit high quality work that demonstrates sound understanding of the concepts and their complexity. Earning an "A" represents oral and written work that is of exceptionally high quality and demonstrates superb understanding of the course material. A "B" grade represents oral and written work that is of good quality and demonstrates a sound understanding of course material. A "C" grade represents a minimally adequate completion of assignments and

participation demonstrating a limited understanding of course material. A “D” grade represents less than adequate completion of assignments and participation demonstrating nominal understanding of course material. An “F” failing grade represents an unacceptable level of completion of assignments and participation demonstrating a lack of understanding of course material.

**Note:** Generally graduate students must receive at least a B- in order to pass a graduate course.

**Grading criteria:**

Assignments – 25%

interim project development– 20%

Research and Experimental Design Project – 35%

Class Participation – 20%

**Illness:**

If you are absent due to illness or a similar valid excuse, please notify me of your situation at [nicholas.giudice@maine.edu](mailto:nicholas.giudice@maine.edu) prior to (or immediately after) your absence.

**Course and Exam Schedule:**

See the attached schedule of class session topics, reading assignment due dates, and dates for exams/projects.

**Class policies:**

Regular attendance and class participation is expected. I place a high value on questions and interactivity, and twenty percent of the course grade is based on your constructive in-class input or subsequent comments.

**Late assignments and make-up:**

Assignments submitted after the due date are docked 10 percent per day and will not be accepted for credit after a week. If you miss an assignment or presentation due to an illness or emergency, you must send notification to me by email prior to the due date (or soon thereafter if there are mitigating circumstances). Special arrangements will be made on a case by case basis.

**Etiquette and other class policies:**

Please submit all class assignments with the following information in the header: your name, assignment title, date, and class number/name. Since I often comment on the assignment in-text or cut and paste them into a single document for distribution to the class for discussion, it is easier to have them in a readily editable

format rather than a PDF. Thus, for any assignments being sent to me vs. posted on the website, please submit documents as a MS word (or PC compatible) document, or in rich text format, or as a text file.

**Required Syllabus Information:**

There are five policy statements required for every syllabus at the University of Maine. These include:

- Academic Honesty Statement
- Student Accessibility Services Statement
- Course Schedule Disclaimer
- Observance of Religious Holidays/Events
- Sexual Discrimination Reporting

Please see the following URL for descriptions of all of the above policies:  
<https://umaine.edu/citl/teaching-resources-2/required-syllabus-information/>

## Tentative Weekly Schedule

### **Week 1:**

- Introduction: What is research, what is not research, experimental design  
Complete IRB tutorial: <http://www.umaine.edu/research/research-compliance/institutional-review-board-for-the-protection-of-human-subjects-irb/required-training/>

### **Week 2:**

- Ethics, IRB, working with human subjects

### **Week 3:**

- Identifying and describing the research problem:
  - Stating the hypothesis
  - Defining terms and assumptions

### **Week 4:**

- Utilizing library databases and indexes for literature reviews:
  - Knowing when to quit

### **Week 5:**

- Scales of measurement:
  - Validity and reliability of measurement
  - Identifying appropriate measurement instruments

### **Week 6:**

- Relations between variables and the importance of control

### **Week 7:**

- Midterm presentations

### **Week 8:**

- Experimental Designs
- Between subject's designs:
  - One factor

- Multifactor between subject's designs
- Repeated measures designs
- Mixed model—between/within factor designs

**Week 9:**

- No class lecture
- Work as teams on setting up your project design

**Week 10:**

- Data collection/sampling:
  - Different types of distributions

**Week 11:**

- Data manipulation –cleaning, structuring, and storage

**Week 12:**

- Statistical techniques for analyzing data

**Week 13:**

- Data interpretation:
  - Data graphics and figures

**Week 14:**

- Moving from data graphs, statistics, and numbers to words—telling the best story

**Week 15:**

- Class presentations of final oral design project
- Submit written paper