Behavioral Sciences 471

Engineering Psychology

Fall 2006

Beh Sci 471 Course Syllabus

INSTRUCTOR

	Sections	Office	Phone
Lt Col Terence Andre	T2	5L50	x2972

RESOURCES

Required Text

Wickens, C. D., & Hollands, J. G. (2000). Engineering psychology and human performance (3rd ed.). Upper Saddle River, NJ: Prentice Hall. [**EPHP]**

Additional Reference Material

Kantowitz, B. H., Roediger, H. L., & Elmes, D. G. (2005). *Experimental psychology*. Belmont, CA: Wadsworth Thompson Learning. **[EXP]**

Weimer, J. (1995). *Research techniques in human engineering*. Englewood Cliffs, NJ: Prentice Hall. **[RTHE]**

Wickens, C. D., Lee, J. D., Liu, Y, & Gordon-Becker, S. E. (2004). *An introduction to human factors engineering* (2nd ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

COURSE OVERVIEW & OBJECTIVES

Overview

Humans perform as components of larger systems of various complexities, and as human factors engineers we need to understand how humans fit-in as system components. The main goal of engineering psychology is to specify the capabilities and limitations of the human so that systems engineers (especially human factors engineers) can develop better design solutions. In this course, you will study what is known about sensation, perception, cognition, and attention in the context of developing usable theories of human performance. With these usable theories, you will be able to develop an experimental setting where some of these theories can be tested in a human-systems context.

This course incorporates much of the foundation material from courses in Cognitive Psychology (Beh Sci 370) and Intro to Human Factors (Beh Sci 373). In addition, we build on research methods and statistics (Beh 331/332 and Math 356) in order to set up an experimental design to test an applied research question. In addition to the theoretical underpinnings that you will explore in this course, you will begin your development of skills that will help you to contribute to the field of human factors and to the development of new design principles for human-machine interaction.

Objectives

By the time you finish this course, you will be able to:

- Apply theories and methods of human factors and engineering psychology as they relate to human-machine interaction.
- Integrate various theories and methods in order to develop research questions.
- Evaluate research questions in the context of human performance capabilities and limitations.
- Report research in human factors and engineering psychology orally and in writing.

GRADING AND ASSIGNMENTS

There are five types of evaluations in this course: quizzes, lab, research paper critique, and a team research project. All of them are designed to expand your understanding of engineering psychology and build your skills in applying theoretical principles.

Quizzes

This course will use a "quiz last" format. There will be approximately 3-4 lessons of lecture/discussion/instruction followed by a quiz. The purpose of these quizzes is to make sure you have a good understanding of the concepts and research methods before you press fully into your research project. You will have 2 quizzes, mostly multiple choice and short answer, each worth 75 points (for 15% of your total grade). Authorized Resources: None.

Lab

The purpose of lab work is to reinforce how the basic theories were developed and how subsequently they contribute to the development of design principles. You will participate in one lab worth 100 points (for a total of 10% of your total grade). Use APA format for citations and references in your lab reports. Authorized Resources: Your instructor, course notes, course text, and references you obtain.

Research Paper Critique/Presentation

Each student will review a human factors journal article and present a summary critique of the article in class. You will answer several questions in your critique and turn in a report of your findings and make an oral presentation to the class. The Research Paper Critique is worth 100 points (10% of your total grade), with 30 points for the presentation and 70 points for the written critique. Authorized Resources: Your instructor, course notes, course text, and references you obtain.

Progress Review Meetings

You will meet with me three different times during the second part of the semester as part of your research project team. For each meeting, I will provide you with action items and objectives to accomplish for the next meeting. I will assess your progress, planning, leadership, and ability to

follow directions during each meeting. Authorized Resources: Your instructor, assigned team members, course notes, course text, and references you obtain.

Research Project

The purpose of this project is for you and one or two other team members to explore an area of interest through an experimental design setting. You will select a human factors topic area and propose an experimental design to test a specific hypothesis. After your proposal is approved, you will use the department's participant pool to recruit subjects and collect data. Your group will make an oral presentation and produce a final report in APA format. The research project is worth 450 points (45% of your grade) and is divided into multiple milestones throughout the semester for you to meet, which are briefly described below. Authorized Resources: Your instructor, assigned team members, course notes, course text, and references you obtain.

Project Topic Summary
The project topic summary will be a document of approximately 200 words describing the topic area you plan to investigate and justify the relevance to the course. (25 points)

Proposal
The proposal will provide a detailed description of the problem you plan to investigate, background literature, previous work, and your specific hypothesis. In addition, the proposal will describe your planned method (participants, equipment, experimental design, and procedure) and expected results. (100 points)

Presentations
Your group will give a formal presentation to the class on your proposal, highlighting the importance and relevance of the topic. (100 points)

Final Paper
Culminating your research project will be a final paper for each team, APA format. (225 points)

Graded Events Summary:

Graded Event	Prog	Final	Weight
Quizzes (2 @ 75 pts each)	75	75	15%
Lab	100		10%
Research Paper Critique/Presentation	100		10%
Research Project			
- Project Topic Summary	25		2.5%
- Project Proposal	100		10%
- Project Oral Presentation		100	10%
- Project Final Paper		225	22.5%
Progress Review Meetings (3 @ 50 pts each)		150	15%
IRB Process Execution/Participation		50	5%
Total	400	600	100%

*Individual project grades will be weighted by amount of participation in team effort (see Team Member Evaluations next).

Team Member Evaluations

Each member of the team is expected to contribute equally to each part of the research project. It is possible that the most difficult part of the project assignments is working well together in a group. Be aware of possible group problems and be ready to solve them. Don't make the mistake of taking this aspect for granted.

Sometimes, despite our best efforts, some team members end up not pulling their fair share of the weight. To ensure that each team member is given a project grade reflecting individual contributions, the final project assignment is a Team Member Evaluation. Each team must INDIVIDUALLY turn in a paper copy of the Team Member Evaluation Form as a required deliverable to report the relative effort/contribution of each person on your project team over the whole project (including yourself).

This form is not optional. Be professional and give a careful rating. The ratings on these forms will be used as weightings, as explained at the beginning of the semester, to convert team research project grades into individual student project grades. The team is given a grade for each part of the project. Each individual team member's grade for each project assignment is a weighting of the team grade, where the weighting is based on an evaluation of individual contributions, collected from each team member at the end of the semester (and moderated as necessary by the instructor).

COURSE POLICIES

Attendance and CAS Accountability

If you know you will be gone on a trip or for some appointment, it is your duty to notify me in advance! Except in the case of emergencies, you must have my approval prior to missing class. **If you are absent without having provided me with prior notification, you should report to me personally the same day of your absence.** If this is not possible, please send me your reason for absence via e-mail before the end of the day you were absent.

Late Work

All work is due at the beginning of the class period on the due date. If you run into problems, you need to see your instructor before the due date—it is your responsibility to keep your instructor informed. Work turned in late will receive a 10% grade reduction per 24-hour period, to include weekends. Therefore, if a written assignment is due on a Friday and you do not turn it in during class, you must e-mail it to your instructor on Saturday by the time class usually starts during the week, otherwise it will be considered late for another 24-hour period. If you know you will be gone, you must coordinate an acceptable turn-in date with your instructor prior to the due date. Your instructor will work with you to give you every opportunity to turn in top-quality work, but you must coordinate in advance!

Graded Assignments

All written assignments and all quizzes are required graded events for this course. Failure to complete any one of these assignments will result in a Controllable Incomplete (“IC”) grade for the course. Failure to resolve an “IC” within the timeline established by the course director will result in the conversion of the “IC” to an “F” for the course.” If you miss a quiz for an excused reason, you

will need to come by my office and make up the quiz before the next lesson, or on the first school day after you return from a trip.

Documentation and Plagiarism

- On all written assignments (homework and research project), you should document using APA format.
- All assignments are subject to scanning for plagiarism IAW the procedures specified in the Honor and Academics Policy Letter posted in each classroom.
- A documentation statement is required on all graded homework and team projects. If you do not use any resources or receive any help, a “Documentation: None” statement must be included with the assignment. An assignment without a documentation statement will not be accepted or will be returned ungraded to the cadet and a late penalty will be assessed based on when the documentation statement was completed.
- Assignments that violate academic integrity will be dealt with academically as well as through the honor process (if appropriate).
- Violations of academic standards (e.g., plagiarism, lack of documentation, over-reliance on outside sources or someone else’s work [even if properly documented]), whether or not an Honor Code violation is suspected, will receive an academic penalty. Such penalties may include receiving a failing grade on the assignment, being required to reaccomplish the assignment, receiving a controllable incomplete for the course, and/or failing the course.

COURSE SCHEDULE

Lsn	Date	Topic	Assignment
1	11 Aug	Introduction to Engineering Psychology	**[EPHP]** (Chap 1: 1-14)
2	15 Aug	Selecting a Research Topic	Handout **[RTHE]** (Chap 2: 20-45)
3	17 Aug	Review of Experimental Design	Handout **[RTHE]** (Chap 3: 49-64)
4	21 Aug	Lab Tour	
5	23 Aug	Psychophysics I - Methods	Handout **[EXP]** (Chap 6: 152-168)
6	25 Aug	Psychophysics II – Measurement Scales	Handout **[EXP]** (Chap 6: 168-177)
7	29 Aug		**Quiz #1**
8	31 Aug	Psychophysics Lab	**Lab 1 Handout** **Project Topic Due**
9	5 Sep	Selective Attention and Visual Search	**[EPHP]** (Chap 3: 69-86)
10	7 Sep	Parallel Processing and Divided Attention	**[EPHP]** (Chap 3: 86-102)
11	11 Sep	Format for Project Proposal	**Lab 1 Due**
12	13 Sep	Research Paper Critique	Student Presentations
13	15 Sep	Research Paper Critique	Student Presentations
14	19 Sep	Research Paper Critique	Student Presentations
15	21 Sep	Attention and Time Sharing	**[EPHP]** (Chap 11: 439-458) **Project Proposal Due**
16	25 Sep	Navigation and Spatial Cognition	**[EPHP]** (Chap 5: 158-171)
17	27 Sep	Visualizing Information	**[EPHP]** (Chap 5: 176-186) **Project Feedback**
18	29 Sep		**Quiz #2**
19	3 Oct	Research Project Prep	Meet with Team Members
20	5 Oct	Research Project Prep	Meet with Team Members
21	10 Oct	Research Project Prep	Meet with Team Members
22	12 Oct	Present Research Protocol to IRB	**IRB Meeting**
23	17 Oct		**Progress Review Meeting #1**
24	19 Oct	Research Project Equipment Setup	
25	23 Oct	Research Project Equipment Setup	
26	25 Oct	Research Project Equipment Setup	
27	27 Oct	Research Project Equipment Setup	
28	31 Oct		**Progress Review Meeting #2**

29	2 Nov	Research Project Data Collection	
30	7 Nov	Research Project Data Collection	
31	9 Nov	Research Project Data Collection	
32	13 Nov	Research Project Data Collection	
33	15 Nov		**Progress Review Meeting #3**
34	17 Nov	Data Analysis	
Thanksgiving Break			
35	29 Nov	Data Analysis	
36	1 Dec	Data Analysis	
37	5 Dec	Research Project Presentations	Teams 1 & 2
38	7 Dec	Research Project Presentations	Teams 3 & 4
39	11 Dec	Research Project Presentations	Teams 5 & 6
40	13 Dec	Course Critique & Wrap-up	**Final Project Due**