

Human Factors in Work Design (ISE 370L) Curriculum

Spring 2018

Lectures Tuesday/Thursday 5:00-6:20 PM (KAP 148)

Labs: Wednesday 5:00-7:20, Friday 2:00-4:20

Instructor:

Office Hours: Tuesday/Thursday, 2:30-4:30 PM or by appointment

Dr. Suzanne M. Dawes

Office Location: TBD

Telephone – Work – (310) 336-5643

Telephone/Text – Cell – (626) 378-4647

Email: USC Email – dawes@usc.edu

Email: Work: suzanne.m.dawes@aero.org
(best email to reach me)

Personal Email: smdawes@aol.com

Lab Teaching Assistant

Ms. Ghena Alhanaee

Ghena Alhanaee <alhanaee@usc.edu>

Office Hours: See Lab Fact Sheet

Office Location: See Lab Fact Sheet

Phone: See Lab Fact Sheet

See Lab Syllabus for additional information

Text Books

Required:

1. Helander M. (2005). *A Guide to Human Factors and Ergonomics*. CRC Press (2nd Ed)

For work and Time studies, chapters will be provided from:

2. Kanawaty, G., (ED). (1992). *Introduction to Work Study*. (Fourth revised edition)

Optional:

1. Casey, S. (1993). *Set Phasers on Stun: And Other True Tales of Design, Technology, and Human error*. Santa Barbara: Aegean Publishing company.
2. Casey, S. (2006). *The Atomic Chef: And Other True Tales of Design, Technology, and Human Error*. Santa Barbara: Aegean Publishing Company.

Course Description (from *Courses of Instruction*)

ISE 370L Human Factors in Work Design: Physiological systems and psychological characteristics; ergonomics; anthropometry; effects of the physical environment on humans; occupational safety and health; work methods. *Prerequisite*: ISE 225.

Academic Integrity Statement

USC seeks to maintain an optimal learning environment. General Principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. *SCampus*, The Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A: <http://usc.edu/dept/publications/SCAMPUS/gov/> Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review should there be any suspicion of academic dishonesty. The Review process can be found at: <http://usc.edu/student-affaris/SJACS/> Information on intellectual property at USC is available at: <http://usc.edu/academe/acsen/issues/ipr/index.html>.

Emergency Preparedness/Course Continuity in a Crisis

In case of emergency, when travel to campus is difficult, if not impossible, USC executive leadership will announce a digital way for instructors to teach students in their residence halls or homes using a combination of the Blackboard LMS (Learning Management System), teleconferencing, and other technologies. Instructors should be prepared to assign students a "Plan B" project that can be completed 'at a distance.' For additional information about maintaining your classes in an emergency, please access: <http://cst.usc.edu/services/emergencyprep.html>

Classroom Access

Any Student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m. - 5:00 p.m., Monday through Friday. The phone number for DSP is (213)740-0776.

Statement for Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to your course instructor (or TA) as early in the semester as possible. DSP is located in STU 301 and is open from 8:30am to 5:00pm, Monday through Friday. Website and contact information for DSP [http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html\(213\)740-0776](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html(213)740-0776)(Phone), [\(213\) 740-6948](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html(213)740-6948)(TDD only), [\(213\) 740-8216](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html(213)740-8216)(FAX) ability@usc.edu

Course Procedures

Material will be presented in a variety of ways. These will include: text related material, lectures, handouts (published articles and unpublished manuscripts), discussions, case studies, and guest speakers. Additionally, the instructor may present alternative approaches, theories, models, and points of view that are different from the reading material. While this may not represent personal beliefs, it is often helpful in:

- Familiarizing the student with different theoretical models used in the discussed subject matters; and
- Providing the student a chance to examine his/her own studies, experiences, and integrate these with other sources of information.

The use of laptops and other electronic devices in class is encouraged as long as it does not distract from the learning environment. Laptops and other electronic device use during exam periods will not be permitted. Please be respectful of the other students by turning off or muting your devices.

If you are sending an email to the instructor and/or TA we would appreciate it if you include ISE370 in the subject line. This will help ensure we respond in a timely manner.

Grading Basis

Grades will be based on the following weighted criteria:

1. Exam#1	15%
2. Exam#2	10%
3. Exam#3 – Final Exam –	15%
4. Lab Reports	20%
5. Design Projects	20%
6. Term Research Paper	10%
7. Class Participation & Attendance	10%
Total	100%

Exams

Your knowledge of the course material will be evaluated by two midterms and a final. All exams are closed book/closed notes and will cover all material presented in class including readings, handouts, labs, guest lectures, class exercises and discussions. You will be given the entire class period to complete the exam. No makeup exams will be offered except in special circumstances. The date of the final exam is set by the university and cannot be modified except by university policy.

Lab

Labs will reinforce and augment course material and provide practical application of concepts and theories presented in class. Refer to the Lab Outline for assignments and grading. Lab attendance is MANDATORY.

Homework

Additional Homework assignments may be given during the class. These will be considered as part of the class participation grade.

Design Projects

Integrated throughout the class will be the application of the approaches towards the design of a project related to Human Factors Engineering.

There will be three design projects due this semester.

1. The first design project will be an opportunity for you to evaluate something that you use in your life relative to Human Factors Engineering (10% of Design Project Grade)
2. The second design project will focus on Human Computer Interface (HCI) design. We will be evaluating an existing Human Computer Interaction. (40% of Design Project Grade)
3. The third design project will focus on the evaluation of a system and will include evaluation of both hardware and software. (50% of Design Project Grade)

The first design project will be an individual project. You will work in a group of 2 -3 students per group for the second and third projects. Presentations will be required throughout the semester.

Term Paper

An individual written paper (research) paper related to the course material is required. You may choose to either complete a research paper or complete a paper that analyzes the design of a work environment or design item. Alternative and/or sample topics will be discussed during the second class meeting. This is an individual project that focuses on the application of human factors to one topic of interest to you. The requirements for the term research paper include:

- a. Term Research Paper proposal (1/2 a page), due date: February 15, 2018
- b. Progress report (one page), due date: March 29th, 2018.
- c. Final paper (written document, approximately 10 pages), due date – No Later than start of Final Exam Period (May 3rd, 4:30 PM).

Course Outline
Human Factors in Work Design (ISE 370L)
Spring 2018

<u>Dates</u>	<u>Topics</u>	<u>Reading Assignments</u>
Week of 1/8 (Jan 9 and 11)	<ul style="list-style-type: none"> • Course logistics and overview • Role of Humans in Technological Systems • Introduction to Human Factors and Ergonomics 	Helander, Chapter 1 Handouts
Week of 1/15 (Jan 16 and 18)	<ul style="list-style-type: none"> • Cost-Benefit Analysis of Improvements in Human Factors Design • Controls, Displays & Symbols 	Helander, Chapter. 2, & 6 Handouts
Week of 1/22 (Jan 23 and 25)	<ul style="list-style-type: none"> • Human Factors Investigation • Human Computer Interaction (HCI) 	Helander, Chapter 3 & 7
Week of 1/29 (Jan 30, Feb 1)	<ul style="list-style-type: none"> • Introduction to Anthropometry • Work Posture • Anthropometry for Special Populations 	Helander Chapter 8 Handouts
Week of 2/5 (Feb 6, and 8)	<ul style="list-style-type: none"> • Feb 6th - Individual Presentations – Human Factors Examples in Everyday life, Exam Review • Feb 8th – MIDTERM #1 • 	
Week of 2/12 (Feb 13 and 15)	<ul style="list-style-type: none"> • Work Posture, Workstation Design • Ergonomics of Computer Workstations • February 15th Term Paper topics due • 	Helander Chapter 9 & 14
Week of 2/19 (Feb 20 and 22)	<ul style="list-style-type: none"> • Vision and Illumination Design • Human Information Processing • Case Studies 	Helander, Chapter 5
Week of 2/12 (Feb 13 and 15)	<ul style="list-style-type: none"> • Physical Workload & Heat Stress • Noise and Vibration 	Helander, Chapter 12 & 13

<u>Dates</u>	<u>Topics</u>	<u>Reading Assignments</u>
Week of 2/26 (Feb 27, Mar 1)	<ul style="list-style-type: none"> • February 27th - Design Project #1, Human Computer Interaction – In Class Presentation • Case Studies, Guest Speakers, Midterm Review 	Handouts
Week of 3/5 (Mar 6 and 8)	<ul style="list-style-type: none"> • March 6th – MIDTERM (Closed Book, Closed Notes) • Marth 8th – Case Study, Guest Speakers 	
Week of 3/12	<ul style="list-style-type: none"> • SPRING BREAK 	
Week of 3/19 (Mar 20 and 22)	<ul style="list-style-type: none"> • Introduction to Repetitive Motion and Tool Design • Manual Material Handling • Introduction to Task Analysis • Introduction to Training 	Helander, Chapter 10 & 11, 15 Handouts
Week of 3/26 (Mar 27and 29)	<ul style="list-style-type: none"> • Introduction to Work Measurement and Time Study • Time Study: Rating and Standard Time • Introduction to Predetermined Time Systems • March 29th - Progress Report Term Paper Due 	Handouts (ILO Chapter 18 & 20)
Week of 4/2 (Apr 3 and 5)	<ul style="list-style-type: none"> • Examples of Time Study • Predetermined Time Study • Methods of Direct Observation and Visualization, Predetermined Time Systems, MTM-1 2, 3, • MOST 	Handouts (ILO Chapter 25 & 26)
Week of 4/9 (Apr 10 and 12)	Human Error, Accidents and Safety	Helander, Chapter 5 & 18
Week of 4/16 (April 17 and 19)	Human Factors of Complex Technological Systems' Accidents Human Factors in Nuclear Power Plant Control Room Design Case Study – Human Factors in Complex Tech Systems Accidents – Three Mile Island, Bhopal, Chernobyl, recent aviation and rail.	Handouts

<u>Dates</u>	<u>Topics</u>	<u>Reading Assignments</u>
Week of 4/23 (April 24 and 26)	<ul style="list-style-type: none"> • Design Project #3 – In class presentation • Final Exam Review 	
Thursday, May 3	<ul style="list-style-type: none"> • Term Paper Due 	Posted no later than start of final exam.
Thursday, May 3	Final Exam (4:30- 6:30 PM) (Closed Book, Closed Notes)	